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CANADIAN ARMY
MANUAL OF TRAINING

SURVIVAL OPERATIONS

(1961)

PREPARED UNDER THE DIRECTION OF
THE CHIEF OF THE GENERAL STAFF

ARMY HEADQUARTERS
OTTAWA

AMENDMENTS

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DISTRIBUTION

Scale D for the Canadian Army Regular and Militia

FOREWORD

In the event of a nuclear attack on North America, survival operations would be the first priority of all Regular and Militia units located in Canada and not engaged in the direct defence of the Nation. The Army would be joined in these operations by available elements of the Royal Canadian Navy and the Royal Canadian Air Force.

The Army's role in survival operations is a challenging one and we must prepare for it by thorough planning and realistic training. It is not a completely new role as it is, in many ways, an extension of the role which has been undertaken for many years in aid of the civil power in national disasters. The responsibilities and the magnitude of the tasks have expanded greatly, however, and although studies are still being conducted on many aspects of the role, the doctrine and procedures set forth in this manual provide a sound basis for planning and training. As the results of future studies are assessed and as experience is gained at study periods and on exercises, new ideas and techniques will be developed and these will be incorporated in the manual.

It is recognized that the Army could not carry out survival operations by itself. Survival operations must therefore be based on integrated planning with civilian authorities at all levels and on the use of all available military and civilian resources, including assistance from many civilian volunteers.

S. F. Clark

(S. F. Clark)

Lieutenant General
Chief of the General Staff

INTRODUCTION

This manual covers the doctrine, principles and procedures for survival operations. With its companion manual, CAMT 2-92, Basic Rescue 1961, it supersedes CAMT 2-91 (Provisional) 1959.

The establishments shown in the manual indicate general organizations and are included as a guide only. Detailed establishments and equipment tables are still under study.

Some of the plates in the manual illustrate damage zones by use of concentric circles. They provide a useful and practical basis for planning and serve to indicate gross effects. However, it must be borne in mind that nuclear effects, particularly blast, would almost never be symmetrical over a target area because of variations in the terrain, including the presence of built-up areas, and, to some extent because of the behaviour of the weapon itself. Similarly, figures for radii of damage and other effects are intended as a general guide only. They will not coincide in every case with those found in other publications but these variations are not significant. Bearing in mind the initial margin of error in all planning based on nuclear weapons effects, any precise refinement of figures may suggest an accuracy that could be misleading.

This manual does not deal with the roles and functions of corps and units in survival operations where these approximate the roles and functions described in existing manuals.

GLOSSARY OF TERMS

Airburst

The explosion of a nuclear weapon at such a height that the fireball does not touch the surface of the earth.

Alert Warning

A state of warning disseminated to the public by a steady siren signal of three minutes duration and by simultaneous transmission over designated broadcast stations by a voice message. The siren signal indicates that urgent information will be broadcast immediately concerning the degree of imminence of an attack.

All Clear

A message or broadcast to the public indicating the end of immediate danger from attack.

Burst

A nuclear detonation.

Casualty

An individual incapacitated through injury or death.

Civil Defence

A function of government and the activities of delegated agencies at all levels dealing with plans, preparations and organization for those emergency measures which are primarily related to the survival of the population during the period of an emergency which may arise from war or a peace-time disaster.

Contamination, Radiological

Deposit and/or absorption of hazardous radiological material.

Damage Assessment

The appraisal of the effect of attacks on targets.

Damage Criteria

Standards or measures used in estimating specific levels of damage.

Damage Report

A report which gives the extent of damage and an assessment of the work to be done in a given area.

Decay

The decrease in activity of any radioactive material with the passage of time.

Decontamination

Removal or reduction of the hazards of contamination by any means.

Domiciliary Care

The provision of food, shelter and medical treatment for persons whose condition does not warrant retention in a medical station.

Dose

The amount of nuclear radiation received by a person (expressed in roentgens or milliroentgens).

Dose Rate

The rate at which nuclear radiation is received. (Usually expressed in roentgens per hour).

Dosimeter

An instrument which measures the total amount of radiation absorbed by a person during a period of time.

Evacuee

A person removed from his place of residence by direction of military or civil authority for reasons of his own security or because of an emergency situation. Also a person who leaves a damaged or dangerous area of his own volition to seek safety.

Evacuation

The movement of people, voluntarily or under direction, from damaged, dangerous or potentially dangerous areas.

Fallout

The settling from the atmosphere of radioactive particles produced by a nuclear explosion. The term is also applied in a collective sense to the contaminated matter itself.

Fallout Area

The area on which radioactive materials have settled or the area on which it is predicted from weather conditions that radioactive materials may settle.

Fallout Warning

A warning issued when any community, district or area is judged to be in danger from radioactive fallout.

Fireball

The luminous sphere of hot gases which forms immediately after a nuclear explosion.

Geographical Reference System

A standard grid method of position reporting, using the earth's graticule of latitude and longitude as the grid.

Green Line

A line on the ground based on the 1 r/hr iso-intensity line. It will follow distinguishable ground features and will define the normal forward limit for administrative locations and functions.

Ground Zero

The point on the earth's surface directly above or below the point of burst of a nuclear warhead.

Height of Burst

The height above the earth's surface at which a nuclear weapon is detonated in the air.

Hot Spot

A small area with a higher dose rate than its surroundings.

Initial Radiation

Nuclear radiation (essentially neutrons and gamma rays) emitted from the fireball and cloud during the first minute following a nuclear detonation.

Induced Radioactivity

Radioactivity produced in certain materials as a result of nuclear reactions.

In Refuge

As used in this manual "in refuge" means any place with a protection factor of 10 or more.

Iso-intensity Line

A line which joins points which have the same dose rate at the same time.

Kiloton

One thousand tons.

Megaton

One million tons.

Monitor

The operator of a radiac instrument used to detect and measure radioactivity.

Monitoring

The determination with instruments of the location and intensity of radioactive contamination. It is also called radiological survey.

Mosaic

Assembly of two or more overlapping photographs.

National Survival

Actions taken prior to, during and following any attack on Canada to maintain or restore the political, social and economic fabric of the nation.

Nuclear Radiation

Alpha and beta particles, gamma rays and neutrons emitted from a nuclear reaction.

Nuclear Weapon

A general name given to any weapon in which the explosion results from the energy released by reactions involving atomic nuclei. Thus the atomic bomb and hydrogen bomb are both nuclear weapons.

Oblique Air Photograph

Photograph taken with the camera axis intentionally directed between the horizontal and the vertical.

Overpressure

Air pressure in excess of normal atmospheric pressure; usually expressed in pounds per square inch (psi).

Patient

All sick, injured or wounded personnel receiving medical care or treatment.

Permissible Dose

The maximum total dose of nuclear radiation allowed for any one operation as prescribed by the commander.

Predicted Fallout Pattern

A prediction, made immediately following a nuclear detonation, of the area which will likely be affected by fallout. It is based on an estimation or measurement of the yield and height of burst of the weapon and on a forecast of the upper wind conditions.

Protection Factor

The factor by which the outside dose has to be divided to get the inside dose.

Radioactivity

The spontaneous emission of nuclear radiation by a substance.

Radiation Exposure Report

A report submitted by sub-units to unit headquarters giving the radiation exposure for all ranks and attached personnel.

Radiation Monitoring Report

A report used to pass information on radiation intensities. It includes place of observation, time of observation and dose rate in roentgens per hour.

Random Bomb

As used in this manual it includes all nuclear weapons detonated in any part of the country other than designated probable target areas.

Reception Areas

Areas designated to receive evacuees.

Red Line

A line on the ground based on the 10 r/hr iso-intensity line. It will follow distinguishable ground features and will define the normal forward limit for life-saving operations.

Re-entry Operations

Re-entry operations include all military activities in damaged or seriously contaminated areas, including rescue, first aid, casualty sorting and initial medical treatment, decontamination, control of traffic and movement of people, direction of police and fire services, maintenance of law and order, and direction of municipal and other services for the maintenance and repair of water and sewage systems.

Residual Radiation

Nuclear radiation emitted by the radioactive material deposited after a nuclear burst. Following a nuclear burst, the radioactive residue is in the form of fission products, unfissioned nuclear material, and material, such as earth, water and exposed equipment in which radioactivity may have been induced by neutron bombardment.

Roentgen

Technically a quantity of X-ray or gamma-ray radiation. For simplicity, however, it is used by the Armed Services as a unit of measurement of radiation regardless of the source, whether gamma-ray, X-ray, neutrons, alpha or beta particles.

Scaling Law

A mathematical relationship which permits the effects of a nuclear explosion of given energy yield to be determined at a given distance from ground zero, provided the corresponding effect is known at a given distance from a reference explosion.

Shielding

The protection afforded personnel from nuclear and thermal radiation by the interposition of any material.

Situation Report

A report submitted immediately following deployment and at stated intervals thereafter. It includes location of headquarters and sub-units, present activity, estimated time of completion of tasks and other relevant information.

Sorting

The separation of patients into priority groups for evacuation on the basis of professional medical criteria, which will vary with the type and size of the disaster.

Stereo-pairs

Two air photographs to which a portion of the total area projected thereon is common. Such photographs are used for stereoscopic studies and for mosaics.

Strategic Warning

A notification that enemy-initiated hostilities may be imminent. The time element may vary from minutes, to hours, to days, or more.

Surface Burst

A nuclear burst in which the fireball touches the surface of the earth.

Survival Operations

All operations undertaken by the Canadian Armed Forces in Canada, other than those by forces employed in direct defence of Canada or assigned to NATO Commanders, which contribute directly to national survival.

Sustaining Care

Medical care provided to fit a patient for evacuation and to maintain his condition while awaiting and during evacuation.

Tactical Warning

A notification that the enemy has initiated hostilities. Such warning may be received any time from the launching of the attack until it reaches its target.

Take Cover Warning

A warning issued when any Canadian target city or geographical area is considered to be in imminent danger of attack. It will be disseminated by an undulating siren signal of three minutes duration and by voice transmission over emergency broadcast stations.

Thermal Energy

The heat energy emitted by a nuclear burst, usually expressed in calories per square centimeter incident on the target.

Thermal Radiation

Radiation of heat.

Type of Burst

A classification used to define the height of nuclear bursts in general terms, eg, air burst, surface burst.

Yield

The energy released in a nuclear explosion. It is expressed as the number of tons of TNT necessary to produce the same energy. Thus a warhead yield of 20 kilotons will produce the same energy as 20,000 tons of TNT.

LIST OF ABBREVIATIONS

AFWC	—alternative federal warning centre
ALP	—ambulance loading point
CASS	—Canadian Army Signal System
CFMS	—Canadian Forces Medical Service
cal	—calorie
cm	—centimeter
DND	—Department of National Defence
DNH&W	—Department of National Health and Welfare
DOT	—Department of Transport
DRB	—Defence Research Board
DAMREP	—damage report
EHS	—emergency health services
ECM	—electronic countermeasures
EMO	—Emergency Measures Organization
FC	—filter centre
FRP	—fallout reporting post
FWC	—federal warning centre
FWO	—federal warning officer
FALLWARN	—fallout warning
FALLREP	—fallout report
GEOREF	—geographical reference system
GZ	—ground zero
GS	—general service
HOB	—height of burst
ICBM	—inter-continental ballistic missile
ISORADS	—radiation intensity lines
KT	—kiloton
MT	—megaton
MSC	—mobile survival column
MSG	—mobile survival group

NAPC	—nuclear analysis and prediction centre
NDCC	—nuclear data collection centre
NUDET	—nuclear detonation
NSAWS	—National Survival Attack Warning System
NDFRS	—Nuclear Detonation and Fallout Reporting System
NORAD	—North American Air Defence Command
OCDM	—Office of Civil and Defence Mobilization (USA)
PWC	—provincial warning centre
PWO	—provincial warning officer
POL	—petroleum, oil, and lubricants
psi	—pounds per square inch
RWIC	—regional warning information centre (at HQ of certain NORAD regions)
r	—roentgen
radiac	—radiological detection, indication and computation
RV	—rendezvous
RADREP	—radiation report
RADEXREP	—radiation exposure report
r/hr	—roentgens per hour
SITREP	—situation report
TOB	—time of burst
TP	—traffic post

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CHAPTER 1

GENERAL

SECTION 1—INTRODUCTION

101. **Historical Summary**

a. *General*

- (1) Civil defence measures during the Second World War made a major contribution towards the ability of civil populations to face the hardships brought about by air attack and towards the ability of industry, business and government to continue in operation with a minimum of disruption. Generally speaking, and particularly in the United Kingdom, civil defence consisted of an organization which recruited volunteers, eg, wardens, welfare, rescue and control staffs, to assist local government organizations in carrying out their functions, but was supplementary to the local authority which was responsible for the organization of other services. This concept of civil defence worked reasonably well against the scale and type of attack encountered during the period of the last war in Europe.
- (2) Since 1945, because of the developments in mass destruction weapons, the scope of civil emergency preparations has been greatly broadened. A single attack involving nuclear weapons could seriously disrupt all facets of human activity in a civilized country. As a result, most nations throughout the Western World today recognize the importance of making civil preparations for war-time emergencies an important part of the peace-time efforts devoted to defence.

b. *Civil Defence in Canada—Post War*

(1) *1948-1954*

A civil defence organization was re-established in Canada in 1948 when a special adviser to the Minister of National Defence, designated the Civil Defence Co-ordinator, was appointed. Planning was patterned after the concept of civil defence which evolved from the Second World War and was based on limited attacks involving small yield weapons, the receipt of substantial warning of attack and primarily local action to deal with the results of an attack. In 1951 the responsibility for civil defence was transferred to the Department of National Health and Welfare.

(2) 1954-1959

- (a) A new potential scale of attack involving the delivery of high yield nuclear weapons and reduced periods of warning brought about a new concept in civil defence. The basis of planning became the orderly evacuation at short notice of the main urban areas in Canada should attack on such areas appear to be imminent. Four phases of activity were envisaged:
- i. Pre-attack evacuation and reception of priority groups based upon strategic warning of attack.
 - ii. Compulsory evacuation of remaining population to reception areas, based upon tactical warning of attack.
 - iii. Re-entry operations and control of the population in areas of fallout.
 - iv. Immediate aid for rehabilitation.

(3) 1959

- (a) The enormous advantage to be gained by surprise in nuclear attack and the threat of inter-continental ballistic missiles (ICBM) cast serious doubt on the logic of survival measures based on substantial warning. Moreover, in addition to the serious risk of random bombs, there would be a wide-spread danger from radioactive fallout which would make it unsafe to be in some areas without substantial protection, or to be outdoors for more than very brief periods. As a result a new survival planning policy was evolved which differs from the previous one in that:
- i. No compulsory pre-attack evacuation of likely target areas is planned.
 - ii. Provision is made for voluntary evacuation to enable those who wish to move to do so in an orderly manner.
- (b) This concept involved a substantial rearrangement of civil defence functions. The principal feature of this change was that greater emphasis was placed on the fullest possible use of existing government departments, agencies and employees to develop and implement emergency plans. The aim was to weld the whole structure of emergency planning into one comprehensive force to provide for the continued operation of government and the economy on the one hand and survival measures for the population on the other.

- (c) Legislation to implement this new concept was passed in May 1959 by an Order in Council which became effective in September of the same year. The civil defence functions were absorbed by the Emergency Measures Organization (EMO), which is responsible to the Prime Minister, and a reallocation of responsibilities was made to the various departments of the Government. Civil Defence Order, 1959, is reproduced in para 102.
- (d) Although not mentioned specifically in the Civil Defence Order almost every department of government has additional duties in connection with National Survival. Examples are as follows:
 - i. The Department of Defence Production is responsible for planning a War Supplies Agency and for establishing a skeleton organization in peace time capable of manning this agency on very short notice.
 - ii. The Department of Labour is responsible for the establishment of a National Manpower Authority composed of representatives from both the Department of Labour and the Unemployment Insurance Commission.
 - iii. The Department of Transport is responsible for the establishment of an emergency transport control organization for the federal control of all types of transportation and also for the establishment of an Emergency National Telecommunications Organization (ENTO) to plan in peace time for the control and administration in wartime of the civil national telecommunications system.
- (4) *Summary.* It will be seen that extensive changes have occurred in civil defence philosophy in Canada since 1948. Initially, planning was closely oriented to the local scene of attack. As the potential scale of attack increased the scene enlarged, pre-attack evacuation became the theme, and planning was re-oriented from the vicinity of ground zero to the target area and its surrounding support and reception areas. Finally, based on estimates of enemy capabilities and attack effects, civil defence thinking and planning have been oriented to the entire nation as the unit of survival.

102. **Civil Defence Order 1959****"ORDER"**

"1. This Order may be cited as the Civil Defence Order, 1959.

2. In this Order, the expression "civil defence powers, duties and functions" includes powers, duties and functions relating to the matter of "preparation for civil defence against enemy action" mentioned in section 4 of the National Defence Act.

3. The Minister of National Defence shall have and exercise the following civil defence powers, duties and functions:

- (a) provision of technical facilities and operation of a system to give warning to the public of the likelihood and imminence of an attack;
- (b) determining the location of a nuclear explosion and the pattern of fallout, and giving the necessary warning of fallout to the public;
- (c) assessment of damage and casualties from attack and fallout;
- (d) controlling, directing and carrying out re-entry into areas damaged by a nuclear explosion or contaminated by serious radioactive fallout, decontamination work in those areas, and the rescue and provision of first aid to those trapped or injured;
- (e) direction of police and fire services in seriously damaged or contaminated areas which are the object of re-entry operations, including the control of traffic and movement of people in those areas;
- (f) direction of municipal and other services for the maintenance and repair of water and sewer systems in seriously damaged or contaminated areas;
- (g) provision of emergency support to provincial and municipal authorities in the maintenance of law and order and in dealing with panic or the breakdown of civilian authority;
- (h) maintenance and operation of emergency communication facilities.

4. The Minister of National Health and Welfare shall have and exercise the following civil defence powers, duties and functions:

- (a) assistance to provincial and municipal governments and to others in connection with the organization, preparation and operation of
 - (i) medical, nursing, hospital and public health services.
 - (ii) services to provide emergency accommodation, emergency feeding, emergency supplies, guid-

ance and welfare assistance for persons who have lost or left their homes because of acts of war or apprehended acts of war; and

- (b) maintenance and operation of the Civil Defence School at Arnprior, Ontario.

5. The Minister of Justice shall have, and through the Royal Canadian Mounted Police, shall exercise the civil defence power, duty and function to assist provincial governments and municipalities and their police forces, except as provided in section 3 above, in

- (a) maintaining law and order; and
- (b) controlling and directing traffic in connection with civil defence exercises and operations.

6. The Prime Minister shall have, and through the Emergency Measures Organization, shall exercise the following civil defence powers, duties and functions

- (a) the co-ordination of civil defence planning by departments and agencies of the Government of Canada;
- (b) the preparation of civil defence plans in relation to matters that are not the responsibility of any other department or agency of the Government of Canada;
- (c) assistance to provincial governments and municipalities in respect of preparation for civil defence where assistance is not the responsibility of any other department or agency of the Government of Canada; and
- (d) general liaison with other countries, with the North Atlantic Treaty Organization and with provincial governments on matters relating to civil defence.

7. Where any matters in sections 3, 4, 5 or 6 would, but for this Order, be a power, duty or function of a Minister other than the one referred to therein, that power, duty or function is hereby transferred to the Minister referred to in the section in which that matter is mentioned.

8. This Order does not have the effect of transferring the control or supervision of any members of the public service from one Minister of the Crown to any other Minister of the Crown, or from one department or portion of the public service to any other department or portion of the public service."

103. **Basic Assumptions**

- a. *General.* There is an almost infinite range of possibilities of enemy attack and because of this it is essential that planning be kept flexible and capable of quick modification. In order to plan effectively, however, reasonable

assumptions must be made as to the scale and pattern of attack to be expected. The basic assumptions shown in the following subparagraphs form the general background against which this manual is written.

- b. *Strategic Warning.* No strategic warning can be expected by either the general public or the Armed Forces. The possibility of receiving strategic warning, however, should be borne in mind, and planning should be kept sufficiently flexible to take advantage of it should it be received.
- c. *Tactical Warning*
 - (1) It is believed that the present (1961) primary threat is from attack by manned bombers armed with nuclear weapons. Such attacks would probably allow up to three hours tactical warning.
 - (2) It is further believed that the primary threat will change in the next few years to a missile attack, still with nuclear warheads. The tactical warning that may be received at that time will be reduced to some 15 minutes or possibly less.
- d. *Probable Target Areas*
 - (1) If nuclear attack upon North America were to include direct attack on Canada, major cities, industrial centres, ports and seats of government such as Calgary, Edmonton, Halifax, Hamilton, London, Montreal, Niagara Falls, Ottawa, Quebec City, St. John's, Nfld, Saint John, NB, Toronto, Windsor, Winnipeg, Vancouver and Victoria could be considered as the more likely civilian target areas.
 - (2) Because of size and industrial capacity, the largest target areas may be the object of attack by more than one weapon.
 - (3) The number of targets likely to be attacked may increase in future years; moreover, no urban area is necessarily immune from attack or from the indirect effects of attack on purely military targets.
- e. *Yield of Weapon.* Assumed to be five megatons.
- f. *Type of Attack*
 - (1) Irrespective of the means of delivery, the weapon may be either an airburst or a surface burst.
 - (2) Subsequent attacks may be possible and may even be directed at targets already attacked.
 - (3) The period of intense nuclear attack would be limited to a few days.
- g. *Random Bombs.* Because of Canada's geographical position, random bombs may detonate over any part of the country.

h. Shelter

- (1) The total number of household fallout shelters constructed by 1962, with a fallout protection factor of 100, is unlikely to have a significant effect on survival operations. However, most persons could find shelter in basements or other accommodation having a fallout protection factor of approximately 10.
- (2) Few, if any, anti-blast shelters will be constructed in target areas before 1962.

- j. *Maintenance of Law and Order.* In areas which are densely populated and in some municipalities receiving an influx of evacuees it may be difficult for the civil authorities to maintain law and order.

104. Post-attack Situation

a. General

- (1) Canada's vulnerability to nuclear attack is influenced by the concentration of the population, means of transportation, and communications in a comparatively narrow ribbon across the southern border of the country.
- (2) The geographical position of Canada between two great powers, each in possession of an arsenal with a wide range of nuclear weapons, and the close proximity of the Canadian population and industrial centres to priority targets in the USA increases the likelihood of attack.
- (3) The severe climatic conditions during certain months of the year would aggravate the effects of nuclear attack.
- (4) An important planning factor is the vulnerability of the armed forces, a large proportion of which are located within probable target areas.

b. Conditions Likely to Exist Following a Nuclear Attack

- (1) The estimated scale and pattern of attack on Canada could result in the destruction of the major cities with many hundreds of thousands of people killed and as many injured and requiring rescue. Furthermore, the resulting fallout could be of such intensity that only those with adequate protection would survive.
- (2) A nuclear attack could interrupt cross-country rail transport, curtail air movement and destroy most civil communication facilities. This situation might mean that all forms of transportation, with the possible exception of air, would be isolated by regions with little or no means of centralized control, and with no civilian nationwide communications in existence.

- (3) The Canadian Army Signal System should ensure continuity of emergency governmental communication facilities.
- (4) Destruction of the major urban areas would destroy or disrupt the normal commercial distribution facilities for food, clothing, petroleum oils and lubricant (POL) products and electric power. Once household food stocks are depleted food distribution would become a major problem.

c. *Law and Order*

- (1) The confusion arising from nuclear strikes could be on such a scale that the problem of maintaining law and order would be a difficult one. Immediately following an attack thousands of people might attempt to leave the devastated areas. The law enforcement tasks during this period of mass exodus would include crowd control and guarding of vital commodities (eg, POL), as well as traffic control to ensure that evacuation and re-entry routes were not blocked or made impassable.
- (2) Following this initial period, law enforcement difficulties could become even more serious. During this stage evacuees would have dispersed throughout the countryside and the disruption of the normal means of distribution of basic commodities would begin to have serious effects. In addition to other tasks, the duty of guarding such commodities and the provision of anti-looting patrols, might well assume large proportions. This task of providing support to the civil authority for maintenance of law and order would continue until such time as the civil authority had taken steps to ensure adequate control over distribution of food, clothing and other vital necessities; and until road and rail communications had been re-established. This might take weeks, months or even longer.

d. *Re-entry Operations*

- (1) The object of re-entry is to save lives. Re-entry operations comprise all activities in damaged or seriously contaminated areas, including rescue, first aid, casualty sorting and initial medical treatment, decontamination, control of traffic and movement of people, direction of police and fire services, maintenance of law and order, and direction of the restoration of municipal and other services for the maintenance and repair of water and sewage systems.
- (2) The anticipated scale of devastation resulting from the initial nuclear attack would require maximum resources for employment on survival operations.

In such an event the entire resources of the Army in Canada and all available resources from the other services and civilian sources would be needed.

- e. *Recuperation.* Following the completion of re-entry operations, there would likely be a period during which "patch-up" would take place. This refers to immediate tasks to be completed as distinct from long-term rehabilitation. During this time re-entry forces would regroup, reorganize and prepare for further operations at home or abroad, while continuing to discharge responsibilities for warning, monitoring and any additional tasks assigned by the government, such as maintenance of law and order. These tasks would diminish in magnitude as distribution of vital commodities improved. In any case, the release of the military from survival duties would take place as soon as they could be spared so that they could be made available for other military duties.

SECTION 2—THE EMERGENCY MEASURES ORGANIZATION (EMO)

105. **Function**

The Emergency Measures Organization is a planning and co-ordinating agency rather than an operational or control agency. It is responsible for stimulating and co-ordinating emergency planning within government departments and agencies.

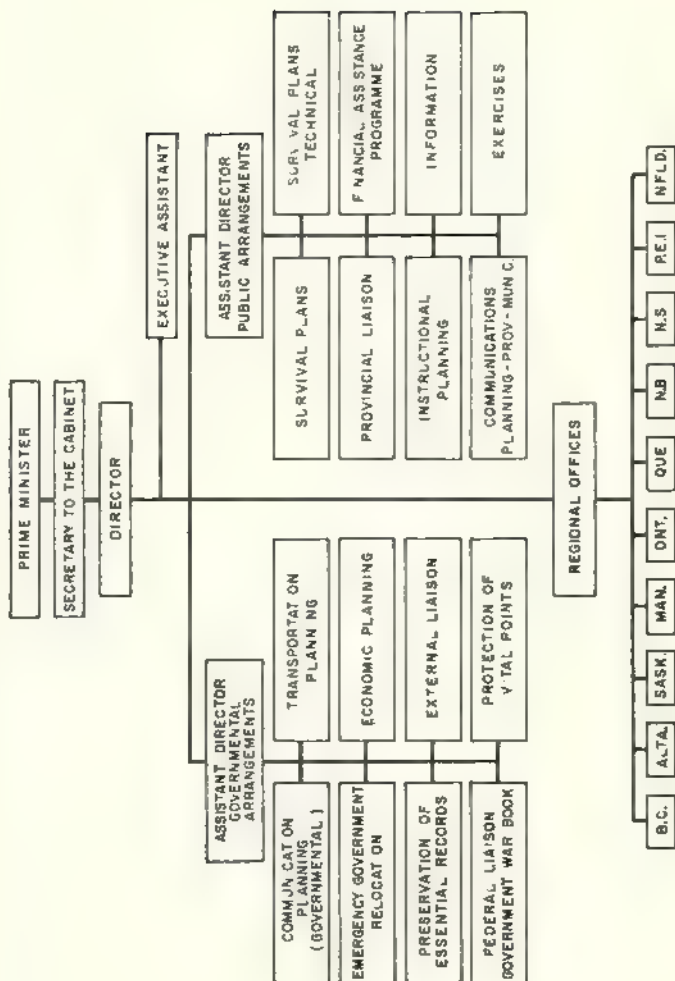
106. **Organization**

- a. EMO is established within the Privy Council Office, with headquarters in Ottawa, the director reporting through the Secretary of the Cabinet to the Prime Minister. A regional office is located in the capital city of each province except for Quebec, where the regional office is located at Montreal. Each region corresponds to its respective provincial boundaries except for Alberta, where the regional officer is also responsible for the Yukon, the District of MacKenzie and Western Arctic Islands of the Northwest Territories.
- b. EMO has been organized into two major functional divisions, each under an assistant director:
 - (1) *Governmental arrangements*—dealing essentially with matters relating to continuity of government;
 - (2) *Public arrangements*—dealing with matters related to public survival.
- c. The organization of EMO is shown at Plate 1.

107. **Functions of Regional Officers**

- a. The regional officers of EMO have the following responsibilities:
 - (1) To represent EMO in the region for all civil emergency planning purposes.

EMERGENCY MEASURES ORGANIZATION



- (2) To establish and maintain effective liaison with all federal departments and agencies, including the Army, and to co-ordinate all emergency planning activities.
- (3) To establish and maintain effective liaison with the provincial government in the region, assist in the development of provincial emergency plans, including those of local civil defence organizations, and assist in the EMO review of requests for financial aid from the province or municipalities within the region.

SECTION 3—DIVISION OF RESPONSIBILITY

108. General

- a. As stated in paragraph 101, the Federal Government decided in early 1959 on a reallocation of responsibilities for civil defence and the division of these responsibilities was promulgated by Order in Council which became effective in September of that year. In broad terms this order:
 - (1) Makes certain tasks, previously considered a primary function at the provincial level, a federal responsibility.
 - (2) Reallocated civil defence duties among federal agencies.
- b. The division of responsibilities is outlined in general terms in the subsequent paragraphs of this section.

109. Federal

The responsibilities assigned to various federal departments are covered in paragraphs 101 and 102.

110. Provincial

- a. The tasks which can most appropriately be carried out by provincial and municipal authorities are:
 - (1) Maintenance of law and order by the use of provincial and municipal police and special constables, with the assistance of the RCMP (with whatever support is necessary and feasible from the armed services at provincial request).
 - (2) Control of traffic on the roads and streets, except in areas damaged or covered by heavy fallout, including special measures to assist in the emergency movement of people from areas likely to be attacked or affected by heavy fallout. The Department of Justice (RCMP) will assist in both operations and exercises in connection with (1) and (2).
 - (3) Reception services including arrangements for providing accommodation, emergency feeding and other

emergency supplies and welfare services for people who have lost or left their homes or who require assistance because of the breakdown of normal facilities.

- (4) Medical services including organization and control of civilian medical services, hospitals (including emergency hospitals) and public health measures.
 - (5) Organization of municipal and other services for the maintenance and repair of water and sewage systems.
 - (6) Maintenance, clearance and repair of highways.
 - (7) Organization of municipal and other firefighting services, and control over the direction of these services in wartime, except in damaged or heavy fallout areas, where firefighting services will be under the direction of the Army as part of the re-entry operation.
 - (8) Maintenance and repair of electrical utilities, and the allocation of the use of electricity to meet emergency requirements.
 - (9) Training of civilians as civil defence workers.
- b. In addition to responsibilities shown above, provinces will make emergency plans for the continuity of government.

111. The Armed Forces

All defence forces located in Canada at the time of an attack, not involved in or required for higher priority tasks in actual defence of the NATO areas, will be employed on survival operations.

SECTION 4—THE ROLE OF THE ARMY

112. General

Within the Department of National Defence the Chief of the General Staff is the member of the Chiefs of Staff Committee charged with the responsibility for the planning and conduct of survival operations. Thus the Army has the primary responsibility for survival operations while the other services and the Defence Research Board have supporting functions. A brief expansion on each of the Army's responsibilities in national survival is given in the paragraphs below.

113. Warning of Attack

- a. The task is stated as "provision of technical facilities and operation of a system to give warning to the public of the likelihood and imminence of attack".
- b. The National Survival Attack Warning System (NSAWS) has been established to collate, assess and disseminate

all data and intelligence which could have a bearing on the need to alert the public. Sources of information include air defence, intelligence and other appropriate agencies. Specific functions include the obtaining of authority to issue the warning, the transmission of pertinent information and instructions to Provincial Warning Centres and the dissemination of warning to the public using the quickest means available. It may be necessary to request the assistance of local police, fire and other municipal government services at lower echelons in establishing reliable means of alerting the public. In such cases the overall responsibility will continue to be vested in the Army with these additional agencies acting on behalf of the Department of National Defence. Each of the armed services is responsible for the measures necessary to warn and protect military installations and establishments (including civilian employees and dependents where located on Department of National Defence premises) against the effects of nuclear attack.

114. Warning of Fallout

- a. The tasks are stated as "determining the location of nuclear explosion and the patterns of fallout, and giving the necessary warning of fallout to the public".
- b. The Nuclear Detonation and Fallout Reporting System (NDFRS) is being organized to accept pertinent information from all agencies capable of providing such information and to provide for its evaluation and transmission to both higher authority and to the general public, as necessary. The system provides for the reporting of fallout incidence across the country and for the forecasting of the areas likely to be affected. The establishment of fallout reporting posts and reliable communications is essential for the efficient operation of the system.
- c. Municipalities are responsible for local radiological defence and the provision of detailed information upon which instructions to the public can be based.

115. Damage Assessment

- a. The task is stated as "assessment of damage and casualties from attack and fallout".
- b. Accurate damage assessment is not possible unless there is a detailed knowledge of the original number of persons, structures, resources, etc in the area concerned at the time of the attack. The acquisition and use of such information is the responsibility of other agencies of government. The Army's responsibility is limited to estimating damage in areas that have been subject to attack. The NDFRS will provide the information on

nuclear detonations that will be needed in damage assessment. The plan for re-entry operations is closely associated with the damage assessment function.

116. **Re-entry**

- a. The tasks in re-entry are stated as follows:
 - (1) "Controlling, directing and carrying out re-entry into areas damaged by a nuclear explosion or contaminated by serious radioactive fallout, decontamination work in those areas, and the rescue and provision of first aid to those trapped or injured".
 - (2) "Direction of police and fire services in seriously damaged or contaminated areas which are the object of re-entry operations, including the control of traffic and movement of people in those areas".
 - (3) "Direction of municipal and other services for the maintenance and repair of water and sewer systems in seriously damaged or contaminated areas".
- b. In addition the Department of National Defence, through the Canadian Forces Medical Service, is responsible for sorting casualties and initial medical treatment.
- c. Re entry would be the largest and most complex of the Army's tasks in the event that survival operations were necessary. Detailed planning and liaison must be carried out with federal, provincial and municipal authorities, a system for control of operations must be established and manpower for rescue, including regular forces, militia, and civilian volunteers, must be organized. The Army cannot conduct successful re-entry alone. It must have the backing of civilian organizations and the use of civilian rescue groups. A strong, active and well trained militia is vital to re-entry operations.

117. **Maintenance of Law and Order**

- a. The task is stated as "Provision of emergency support to provincial and municipal authorities in the maintenance of law and order and in dealing with panic or the breakdown of civilian authority".
- b. The provision of emergency support in this task is in addition to the aid of the civil power for which the Army is liable under Part XI of the National Defence Act and the Department of National Defence policy which provides for assistance to civil authorities in matters generally described as civil emergencies.
- c. During and immediately after re-entry operations the Army may be called upon to discharge without the formalities associated with the provision of aid or assistance under *b*, many tasks in connection with law and order and assistance to civil authorities. These may include:

- (1) Assistance in controlling movement to reception areas.
 - (2) Assistance in ensuring that people remain where they are, to prevent the exposure of persons to fallout hazards by indiscriminate movement from one area to another.
 - (3) following an attack, assisting the available police in maintaining order.
- d. Initial planning for survival operations will provide for the participation of all available forces in re-entry operations although it may become necessary to divert troops to tasks associated with the maintenance of law and order.

118. **Emergency Communications**

- a. The task is stated as, "maintenance and operation of emergency communication facilities".
- b. A system of emergency communications has been organized to ensure the continuity of federal government functions down to sub-regions and zones within provinces. In addition networks are being provided for warning and nuclear activity reporting. Other agencies will assist in the provision of circuits where practicable.

SECTION 5—PRINCIPLES OF SURVIVAL OPERATIONS

119. a. The following principles have been established for planning survival operations:
- (1) Speed in executing rescue operations is of paramount importance to the saving of life.
 - (2) All forces not committed to active operations against enemy forces must be available for survival operations.
 - (3) Maximum manpower must be brought to bear on rescue operations in time to be effective.
 - (4) Survival plans must be flexible to take account of various wind and weather conditions and various attack patterns.
 - (5) Survival plans must be simple and must have been rehearsed so that effective operations may start on minimum orders, or in the absence of orders.
 - (6) Equipment and commodities essential to survival operations must be located outside of probable target areas. Despite the vulnerability of units located inside target areas, plans must aim at their maximum use and must provide for their rapid outward movement to assembly areas.
 - (7) Basic information needed to carry out re-entry operations must be collected beforehand.

- (8) Authority must be decentralized so that local commanders have the necessary powers to execute their assigned responsibilities in case of interrupted communication with higher headquarters.
- (9) Forces engaged in survival operations should be self-sufficient in essential commodities for the period of such operations. National reserves of equipment needed for survival operations must be decentralized because of expected transportation difficulties.
- (10) Forces engaged in survival operations may have to be relieved at an early stage in order to participate in active operations against the enemy or to conduct survival operations elsewhere in Canada.
- (11) Efforts will be directed towards ensuring that maximum warning of the likelihood of an attack is provided to elements of government and the civilian population. Similarly, dissemination of the TAKE COVER and FALLOUT warnings must be provided for on the highest possible priority.

CHAPTER 2

NATIONAL SURVIVAL ATTACK WARNING SYSTEM

SECTION 1—INTRODUCTION

201. General

- a. The National Survival Attack Warning System provides.
 - (1) A means of keeping up to date on the air situation.
 - (2) A means of obtaining authority to issue a warning.
 - (3) A means of disseminating the warning to the public throughout the country.
- b. An organizational chart of the NSAWS is at Plate 2.

202. Air Situation

The detailed tactical picture must come from the tactical NORAD Regional Headquarters concerned. Warning teams located at these headquarters will provide up-to-date information on the tactical situation over the whole of Canada.

203. Authority to Issue the Warning

Authority to issue the initial warning can be given only by the Prime Minister or his personally delegated representative. The federal warning centre (FWC) will obtain this authority and issue the warning throughout the country.

204. Public Warning

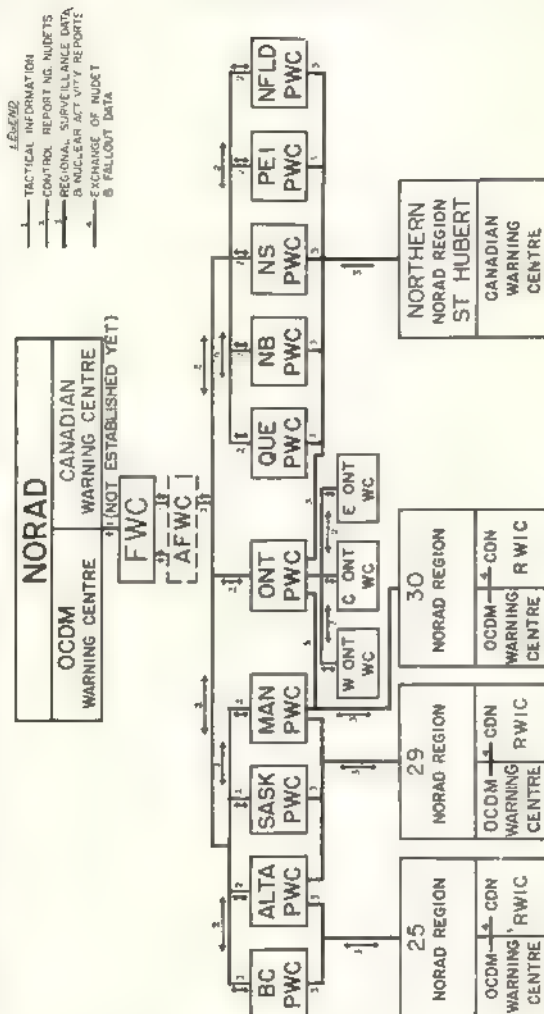
The attack warning system is responsible, once authority is obtained, for issuing the warning immediately right through to the sirens (or other means used to warn the public). The federal and provincial warning centres, in conjunction with the siren network, emergency broadcasts and local police, fire and other municipal services (acting on behalf of DND) are the means by which public warning is disseminated.

SECTION 2—ORGANIZATION AND FUNCTIONS

205. General

- a. The NSAWS will be manned on a full-time basis and will:
 - (1) Provide warning intelligence at the FWC and PWC.
 - (2) Alert the public to the imminence of attack
 - (3) Disseminate warning to target areas and selected EMO headquarters.

NATIONAL SURVIVAL ATTACK WARNING SYSTEM



- (4) Collect, collate and disseminate nuclear detonation and fallout intensity reports.
 - (5) Inform the public of the details of attack, radioactive fallout and other related matters through the facilities of the Canadian Broadcasting Corporation and selected affiliated stations.
- b. The system includes:
- (1) An attack warning centre (not yet in being) at HQ NORAD.
 - (2) Regional warning information centres at the various NORAD region headquarters.
 - (3) A federal warning centre at the location of national government in peace and war.
 - (4) A provincial warning centre in each province.
 - (5) An operational communications network.

206. Attack Warning Centre—HQ NORAD

In the defence of continental USA, Canada and Alaska, early warning information is received at HQ NORAD and is filtered and passed to subordinate air defence establishments. HQ NORAD is the only source of complete and up-to-date early warning information. The Canadian Army warning centre at HQ NORAD will be the primary source of air attack data for the FWC.

207. Regional Warning Information Centres (RWIC)

- a. Headquarters of NORAD regions are the sources of regional tactical information. RWICs are established to provide the NSAWS with air attack surveillance data relating to the conduct of survival operations. These centres also provide information to the USA of nuclear activity in Canada. The following types of information will be passed by RWICs to the PWCs with which they are associated:
- (1) Air attack surveillance data, including reports of all unknown, unidentified or hostile tracks as they appear on the system based on the air activity within their respective regions; and the fading or friendly identification of these tracks as they occur.
 - (2) Changes in the states of readiness and air defence warnings as they apply to their respective regions.
 - (3) Information on pre-attack action taken by USA civil and military authorities with respect to warning.
 - (4) Nuclear activity in their regions as reported by NORAD and Office of Civil and Defence Mobilization (OCDM).
 - (5) Information relating to regional air defence activity which may affect the NSAWS.

- b. RWICs report changes in the Canadian military and civil alert status to their affiliated NORAD regions and OCDM.

208. Federal Warning Centre (FWC)

The FWC controls the operations of the NSAWS. In addition it relays messages between PWCs of different networks and passes all information to PWCs which is not passed directly by RWICs.

209. Provincial Warning Centre (PWC)

- a. The PWC is the primary element in the provincial warning network system. It performs the following functions:
 - (1) Collects and collates air attack surveillance data and nuclear activity data.
 - (2) Informs the FWC and appropriate RWICs of nuclear attack or fallout occurring in their areas of responsibility and changes in provincial alert status.
 - (3) Passes to the FWC a copy of all broadcast messages originated by the Army pertaining to public warning.
 - (4) Informs adjacent PWCs and RWICs of nuclear activity in its area affecting adjacent areas.
 - (5) Selected PWCs relay information between affiliated RWICs and other stations of the system.
- b. The following information when originated by RWICs will be forwarded to the FWC by responsible PWCs:
 - (1) Frequent summaries of air attack surveillance data.
 - (2) Changes in states of air defence readiness and alert status.
 - (3) Nuclear activity.
 - (4) Any other activity which may affect survival operations.
- c. To ensure a state of readiness each PWC will prepare wind vector plots based on each target area in its area of responsibility each time new wind data are received.

210. Communications Network

The communications network is designed to permit the rapid transmission of operational information and the issue of national ALERT and TAKE COVER warnings. It consists of a teletype network extending from the warning centre at HQ NORAD to the FWC and then to each PWC. PWCs are connected to RWICs at NORAD regional headquarters. Both the FWC and PWCs will have outlets to broadcast stations to provide warning and instructions to the public in event of attack or fallout. In addition a communication system links PWCs with elements of the NDFRS which provides information on radioactive fallout (Chapter 3).

SECTION 3—WARNING AND ALERT STATUS

211. General

The Commander in Chief NORAD is charged with the responsibility of conducting active air defence operations over and adjacent to Canada and the continental United States. In this connection NORAD is charged with the task of providing senior federal government officials and the chiefs of the services with information pertinent to the conduct of active air defence measures. In the conduct of these air defence measures the NORAD organization will vary the states of readiness of these elements commensurate with the prevailing threat. Changes in the NORAD states of readiness will not necessarily lead to the warning of the general public, but these changes will be notified to the attack warning system.

212. Procedure for Warning

- a. When intelligence becomes available from political, strategic or tactical sources that an attack on Canada is likely, the established procedure for public warning will be:
 - (1) The FWC will inform the CGS of changes in the air attack status which may lead to the necessity of warning the public. Approval of the Prime Minister will be requested if conditions warrant.
 - (2) When instructed to do so the FWC will disseminate warnings to all PWCs, the Royal Canadian Mounted Police (Ottawa) and EMO (Ottawa).
 - (3) On receipt of a warning the PWC will pass the warning at once to selected civilian authorities and direct to the public in accordance with procedures established within each province by the appropriate army commander.
 - (4) Attack data will continue to be passed throughout the warning system.
- b. The Army is responsible for the dissemination of warnings to the public but the civil authorities are responsible for advising their communities of action to be taken subsequent to the issue of warning.

213. ALERT WARNING

This state will be declared by the federal authority only and will be disseminated by the Army direct from the FWC through PWCs to the Canadian public. Warning will be disseminated by a steady siren signal of three minutes duration and by simultaneous transmission over designated broadcast stations by a voice message. The public on hearing the siren signal should tune to their designated emergency radio broadcast stations for subsequent instructions.

214. TAKE COVER WARNING

This state will be declared when any Canadian city or geographical area is considered to be in imminent danger of attack. It will normally be declared by PWCs when an ALERT WARNING

has previously been sounded and the Army commander or his designated representative in the province concerned considers such action necessary for public safety. The FWO may declare a regional or national TAKE COVER WARNING if he considers circumstances so dictate. The warning will be disseminated by an undulating siren signal of three minutes duration and by voice transmission over emergency broadcast stations. On receipt of the signal the public should go immediately to the best available cover against enemy attack.

215. ALL CLEAR

This state may be declared by the local army authority after consultation with provincial authorities, when any community is considered to be free of danger from direct enemy action for an hour or more. Unless specifically announced, this state will not cancel an ALERT WARNING but will cancel the TAKE COVER warning. The ALL CLEAR will be passed to the public by radio broadcasts and other suitable means. It will not be used as an indication that areas are free from fallout. This will be announced by local authorities by radio and other means after the Army has fully assessed the risk involved.

216. RADIATION FALLOUT WARNING

This state will be declared by Army authorities at either federal or provincial level when any community, district or area is judged to be in danger from radioactive fallout. Warning will be disseminated by the ALERT WARNING, a steady siren signal of three minutes duration, and by simultaneous transmission over emergency radio broadcast stations.

217. Additional Instructions to the Public

The Army will provide communication circuits over which information bulletins will be passed to designated radio broadcast stations or networks. The provision of statements relating to warning for broadcast over these stations is an army responsibility. Subsequent instructions, other than further warnings, are the responsibility of civil authorities.

SECTION 4—PLOTING METHODS

218. The world geographic reference system is used throughout the attack system for the purpose of plotting aircraft movements, nuclear bursts, fallout areas, and other related activity. Air defence plotting procedures and the world geographic reference system (GEOREF) are described in annexes A and B respectively.

SECTION 5—COMMUNICATIONS

219. Organization and Function

- a. *General.* The NSAWS consists of a teletype network extending from the Canadian Army attack warning centre at HQ NORAD to the FWC and then to each PWC.

PWCs are also connected to the RWIC at NORAD regional headquarters. Circuits in a province are illustrated at plate 3.

b. Provincial Warning Networks

- (1) PWCs are linked by line, voice or teleprinter, to points within their respective provinces where detailed attack information is needed. They are also linked to provincial broadcast networks.
- (2) Siren control networks are established in the provinces. Provision, maintenance, installation and sounding of sirens is an army responsibility. When conditions do not permit the sounding of sirens by army personnel, arrangements will be made with municipal or provincial fire, police or other authorities to sound the sirens on behalf of the Department of National Defence.

c. Transmission of Information

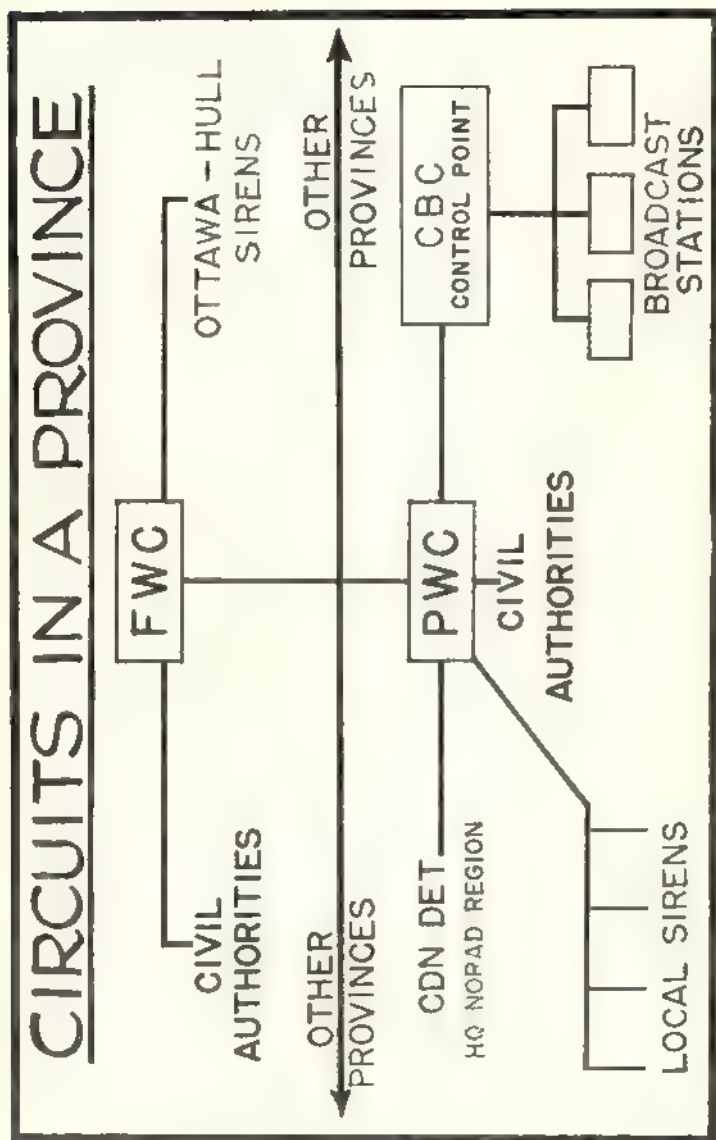
- (1) The NSAWS will only be used for the transmission of the following types of messages:
 - (a) Air attack surveillance messages.
 - (b) Warning and alert messages.
 - (c) Nuclear detonation reports.
 - (d) Nuclear fallout messages.
 - (e) Weather messages.
 - (f) Procedural messages and related traffic.

220 Security

- a. The security arrangements at each element of the NSAWS will conform to the security regulations of the headquarters or station where the element is located. In locations where there is no parent headquarters, elements should operate on a restricted admittance basis to permit essential personnel to carry on their duties without interruption.
- b. Traffic over the warning system will not be classified. If there is a need to transmit classified traffic it will be routed over the Canadian Army Signal System (CASS). Strategic intelligence and related information will not be passed over the warning system.

221. Precedence

- a. Only two degrees of precedence will be used on the warning system:
 - (1) FLASH—of the utmost urgency.
 - (2) ROUTINE—all others.
- b. Receipt of FLASH messages will be acknowledged immediately by addressees. ROUTINE messages will not be acknowledged except when specifically requested in the text of the message.



222. Operating Time Instructions

Greenwich Mean Time (GMT), generally referred to as "Z Time", will be used throughout the warning system. Canada is divided into seven time zones—Newfoundland—Atlantic—Eastern—Central—Mountain—Pacific and Yukon. In addition there will be a need to refer to the eighth time zone used in North America—Alaska. The following table provides a guide for the conversion of local time to "Z Time":

AREA TIME ZONE	TO CONVERT TO "Z TIME"	
	Add to Local Standard Time	Add to Local Daylight Time
Newfoundland.....	3½ hrs	2½ hrs
Atlantic.....	4 hrs	3 hrs
Eastern.....	5 hrs	4 hrs
Central.....	6 hrs	5 hrs
Mountain.....	7 hrs	6 hrs
Pacific.....	8 hrs	7 hrs
Yukon	9 hrs	8 hrs
Alaska.....	10 hrs	9 hrs

223. Air Attack Surveillance Messages

Surveillance messages will be originated by the attack warning centre (HQ NORAD) and the RWICs. The messages may be transferred to the federal and provincial networks, with or without screening at the transfer point, depending on conditions at the time. These messages will contain tactical information concerning air attack of vital importance to national survival operations. Message texts originating within the NORAD organization may contain information concerning commitment of friendly forces and other tactical matters of no application to the warning system. This information may be ignored by the receiving agencies.

224. Warning and Alert Messages

- a. There are four types of national survival alert conditions which will be indicated in messages by the words. ALERT WARNING, TAKE COVER WARNING, ALL CLEAR, and FALLOUT WARNING.

- b. For exercise purposes, code words must be used to avoid any chance of confusion. The corresponding NORAD exercise code words are:
 - (1) WHISKEY JACK in place of ALERT WARNING
 - (2) REDEYE in place of TAKE COVER WARNING
 - (3) FADEOUT in place of ALL CLEAR
 - (4) BIG SHOT in place of FALLOUT WARNING.
- c. During exercises PWCs may pass warnings to subordinate agencies without the use of code words providing the exercise name is used at all times with the warning.

225. Nuclear Detonation Reports (NUDET Reports)

Nuclear detonation reports will be sent immediately by message over the warning system when received by any national survival agency. NUDET reports may be originated by any station in the NDFRS (see Chap 3). They will contain ground zero, yield, height of burst and time of detonation. Reports normally will be collected at PWCs and passed to the FWC and RWICs for dissemination. Duplication in the reporting of detonations will be eliminated by PWCs by evaluating reports prior to transmission to higher headquarters.

226. Nuclear Fallout Messages

- a. There are two types of fallout messages—FALLWARN and FALLREP. Nuclear fallout messages originating in provinces will be passed to the FWC. Collected reports and forecasts provided from sources in the USA will normally be disseminated over the warning system by the FWC.
- b. Radiation fallout warning (FALLWARN) messages are used to warn of the probability of the arrival of fallout. They are sent at FLASH precedence and should contain the following information:
 - (1) TOB — Date/time (GMT) of burst
 - (2) GZ — GEOREF co-ordinates in minutes
 - (3) AZ — Bearing of radial arms
 - (4) PLOT — Effective wind speed, downwind distance of zone 1 in miles and cloud radius in miles. (Zone 1 is the area within which exposed, unprotected people may receive doses greater than 100r within four hours after the arrival of fallout).
- c. Fallout warnings cannot be disseminated to the public in terms of GEOREF. PWCs will originate messages for radio broadcast describing the area of fallout in terms of

recognizable features, eg, towns, roads, railways, etc. Predicted fallout areas will be described to the public in the following sequence:

- (1) Ground zero and the area immediately affected.
 - (2) Left boundary.
 - (3) Limit of area in length.
 - (4) Right boundary.
- d. Radiation fallout report (FALLREP) messages are intensity reports showing collated information of intensity measurements. The radiation level at points within several GEOREF quadrangles will be given and the intensity at those points will be stated in roentgens per hour (r/hr). FALLREP messages will be sent at FLASH precedence.

227. Weather Messages

- a. A knowledge of existing weather and wind conditions (extending to upper altitudes) and forecast conditions, is essential for the prediction of nuclear fallout patterns. The meteorological service of the Department of Transport provides the NSAWS with information on:
- (1) National wind conditions.
 - (2) Local weather conditions.
- b. National wind conditions are sent from the regional warning centre at St Hubert, twice daily. These messages contain direction and speed forecasts for each 6000 ft layer of the atmosphere, from surface to 54,000 ft, for key points throughout Canada and selected adjacent points in the United States. In addition, once daily the wind speed and direction at 80,000 ft over each target city is given. This wind reading is used for fallout plotting purposes for the 54,000 to 90,000 ft level and is considered valid for 24 hours.
- c. Local weather conditions are obtained twice daily by the PWCs from the nearest forecast office. The following information is needed.
- (1) Surface temperature in degrees fahrenheit.
 - (2) Wind direction and speed (true bearing and knots) for surface, 500, 10,000 and 20,000 ft levels.
 - (3) Atmospheric phenomena (precipitation and obstructions to vision).
 - (4) Sky conditions.
- d. The text of weather messages will conform with the format used by the Department of Transport meteorological service.

SECTION 6—TRAINING EXERCISES

228. **General**

- a The functions of the NSAWS will be practised by means of exercises. These exercises are of three main types:
 - (1) Air defence exercises.
 - (2) Canadian Army exercises.
 - (3) Warning system exercises not connected with the specific exercises listed above.

229. **Air Defence Exercises**a. *General*

- (1) The active air defence of North America is the responsibility of NORAD. NORAD consists of a headquarters and a number of regions covering the geographical limits of North America. The regions are subdivided into sectors, each sector having a number of air defence components.
- (2) NORAD HQ regions and sectors each maintain an operations centre which collects, disseminates and displays air defence information concerning its area of responsibility.
- (3) Air defence exercises, both live and synthetic, are conducted at all levels at frequent intervals.

b. *NSAWS Participation*

- (1) RWICs will participate in all NORAD exercises conducted in their respective areas. They will inform the FWC and PWC of all planned NORAD exercises as early as NORAD instructions permit. Their reports will include the type and scope of the exercises to be conducted.
- (2) PWCs will participate in all NORAD exercises in which an RWIC, with which they are associated, is involved but will not introduce exercise traffic without prior approval of AHQ.
- (3) The FWC will relay exercise traffic originated by the attack warning centre at St. Hubert to Ont, Que, NB, NS, PEI and Nfld PWCs.
- (4) AHQ may order the participation of the FWC in selected air defence exercises. PWCs will not forward exercise traffic, other than ALERT state, to the FWC unless requested to do so.

230. **Canadian Army Exercises**

- a GOCs commands may require the participation of PWCs and RWICs in their national survival exercises. The participation of any RWIC or PWC of another command must have prior AHQ approval.

- b. When background or build-up material is required in support of command or area exercises, the required material may be forwarded to AHQ for injection into the NSAWS at the FWC.

231. NSAWS Exercises

a. General

- (1) NSAWS exercises will be conducted to develop and test speed and accuracy in plotting, prediction and reporting at all levels.
- (2) AHQ will initiate exercises involving the whole or part of the NSAWS.
- (3) In addition to the practice obtained from participation in NORAD and AHQ directed exercises, routine exercises and activities as described below will be carried out at levels indicated.

b. Surveillance Reporting

- (1) Data originated through exercises conducted by NORAD will be passed by RWICs to their associated PWCs. PWCs will plot this data.
- (2) The FWC will relay traffic submitted by the attack warning centre, St Hubert, to Ont, Que, NB, NS, PEI and Nfld PWCs.

c. Fallout Plotting

- (1) On the receipt of each new upper wind forecast, fallout predictions will be prepared by each PWC and RWIC for each Canadian and US probable target in their areas of responsibilities.
- (2) PWCs will exchange FALLWARN messages as required.
- (3) Upper wind forecasts will be relayed to 25, 29 and 30 RWICs by Alta, Man and Ont PWCs respectively.

CHAPTER 3

THE NUCLEAR DETONATION AND FALLOUT REPORTING SYSTEM (NDFRS)

SECTION 1—INTRODUCTION

301. The responsibilities of the Department of National Defence for nuclear detonation and fallout reporting have been delegated to the Canadian Army. These responsibilities include three primary functions.

- a. Determining the locations of nuclear explosions.
- b. Determining the patterns of fallout.
- c. Giving the necessary warning of fallout to the public.

302. Nuclear detonations might occur over probable target areas or elsewhere. Also the nuclear threat to probable major target areas in the USA constitutes a serious hazard to extensive areas of Canada. Fallout patterns vary with the wind, weather and many other factors and pose a threat to most of the inhabited areas of the country.

303. Information on nuclear detonations and areas of fallout is of vital concern to the Army and to federal, provincial and municipal governments in the execution of their respective roles and functions in survival operations. Damage assessment, re-entry operations and maintenance of essential services are dependent upon detailed knowledge of nuclear activity and effects.

SECTION 2—ORGANIZATION AND FUNCTIONS

304 a. The NDFRS consists of various components as follows.

- (1) *Nuclear Detonation Reporting Posts (NUDET POSTS)*. Adjacent to the likely target areas designated in Section 1, Chapter 1.
- (2) *Nuclear Analysis and Prediction Centres (NAPCs)*. One at each provincial warning centre.
- (3) *Fallout Reporting Posts (FRPs)*. On a grid of approximately 45 miles EAST and WEST and 15 miles NORTH and SOUTH throughout the populated areas of the country, on an increased scale close to probable target areas and on a reduced scale outside the populated areas.
- (4) *Filter Centres (FCs)*. Established in some provinces to operate as an additional link between fallout reporting posts and provincial analysis and prediction centres.
- (5) *A Federal Nuclear Data Collection Centre (NDCC)*. Operating in conjunction with the FWC.

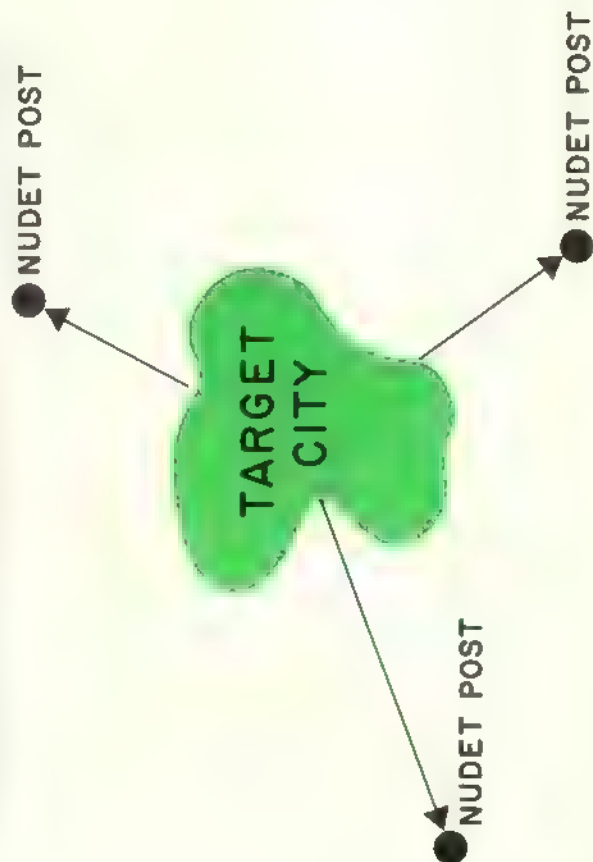
305. The system will provide:

- a. Information as to location, time, yield and height of burst of nuclear detonations that may occur over or adjacent to Canadian territory, with a minimum of delay.
- b. Burst data to government, military and civil agencies at all levels as rapidly as possible over a reliable communications network not subject to failure in an emergency.
- c. Predicted fallout patterns based on available meteorological data and burst information.
- d. Dissemination of predicted fallout warnings to the public.
- e. Revision of fallout prediction based on incidence and intensity measurements of affected areas and subsequent continuing dissemination.
- f. Reciprocal exchange of relevant data with United States civil defence and military agencies.

SECTION 3—NUCLEAR DETONATION REPORTING POSTS

306. Role and Function

- a. The primary role of these posts is to provide data on nuclear detonations on target areas with sufficient accuracy to establish:
 - (1) Ground zero.
 - (2) Height of burst.
 - (3) Approximate yield.
 - (4) Time of detonation.
- b. Maximum speed is required in reporting this information to the provincial analysis and fallout prediction centre. Monitoring of subsequent radiation is a secondary function.
- c. A minimum of three nuclear detonation reporting posts per target area sited in a position to observe inward towards each target area are necessary to provide observation on the scale required, (see plate 4). They will be sited not less than 30 miles or more than 80 miles from the centre of target areas. Their exact location will be related to topographical features, availability of suitable parent installations, other target areas and average weather conditions.
- d. Priority in selecting parent installations to operate the post will be:
 - (1) Department of National Defence (Army)
 - (2) Department of National Defence (Navy, RCAF, DRB and Inspection Services)

NUCLEAR DETONATION REPORTING POSTS

- (3) Department of Transport (air controllers, airways installations, weather reporting stations, and marine services)
 - (4) Department of Justice (RCMP, correctional institutions)
 - (5) Department of Agriculture (experimental farms, etc.)
 - (6) Other federal or provincial government departments.
- e. Using Saint John, NB, examples of possible parent installations are:

<i>Location of Post</i>	<i>Distance (Miles)</i>	<i>Direction</i>	<i>Parent Installation</i>
Camp Gagetown, NB	45	NW	Army
RCAF Station Greenwood, NS	45	EAST	RCAF
HMCS Cornwallis, NS	45	SSE	RCN

307. Manning

- a. NUDET posts will be capable of being manned twenty-four hours daily on a seven-day-a-week basis. Personnel selected for employment in the NUDET post role should be drawn from those occupying positions which are normally manned on a 24-hour basis, such as:
- (1) Security guards and picquets
 - (2) Radio operators
 - (3) Fire prevention personnel
 - (4) Plant and building maintenance personnel.
- b. These personnel would be able to continue on normal duties until the issue of ALERT WARNING following which the reporting post would need to be manned continuously. Tests of communications and equipment and periodic exercises will be necessary.

308. Equipment

- a. It is expected that eventually it will be practicable to install a fully automatic system for detection of nuclear detonations. At the present time the following equipment (or similar equipment) is provided for each primary nuclear detonation reporting post:
- (1) Ground zero indicator 1
 - (2) Artillery directors 1
 - (3) Prismatic compass .. 1
 - (4) Watch GS 1
 - (5) Stop watch GS 1

(6)	Radiacmeter gamma survey remote	1
(7)	Radio station with emergency power supply	1
(8)	Radiacmeter tactical dosimeter 0-600r	3
(9)	Radiac technical dosimeter 0-10r	3
(10)	Charger radiac tactical dosimeter .	1
(11)	Calculators radiac	2
(12)	Bhangmeter (time and light recorder)	1
(13)	Position of burst and yield indicator .	1

- b. Equipment is being provided so that NUDET reporting posts will also be able to report radiation intensities.

309. Communications

NUDET reporting posts need communications which will permit rapid reporting of information to the nuclear analysis and prediction centre. Each reporting post will be provided with a telephone connected to either the closest military or civilian exchange. Two way radio "back up" will be provided to ensure continuity of communication in an emergency. This radio link should work directly to the PWC if its range is sufficient. If not, a relay station sited outside of a target area will be required.

SECTION 4—NUCLEAR ANALYSIS AND PREDICTION CENTRES

310. Role and Function

- a. These centres will operate as components of the PWC. Their role and functions include:
- (1) Monitoring the reports of NUDET reporting posts.
 - (2) Monitoring the reports of United States agencies on nuclear detonations occurring adjacent to Canadian territory.
 - (3) Analysis of effects of reported nuclear detonations over and adjacent to their areas of responsibility.
 - (4) Forecast of radiation fallout plots based on (1) to (3) above.
 - (5) Dissemination of nuclear detonation reports to:
 - (a) The FWC,
 - (b) Adjacent PWCs, and adjacent RWICs.
 - (6) Preparation of fallout prediction forecasts.
 - (7) Dissemination of fallout warnings to the public using the provincial warning network.
 - (8) Monitoring the reports received from radiation monitoring stations on fallout incidence and intensities.

- (9) Revision of fallout and fallout warnings based on intensity reports and dissemination of revised warnings to lower echelons.

311. Manning

The inclusion of the nuclear analysis and prediction centre within the PWC obviates the necessity for the provision of additional personnel for these functions in peace time. The warning centre staff will be augmented under emergency conditions.

312. Communications

- a. The provincial warning network and any emergency circuits will be used by the analysis and prediction centres to disseminate information.
- b. The public will be warned to listen to the radio by the sounding of the ALERT or TAKE COVER WARNING on the sirens and fallout warnings and subsequent instructions will be issued over the emergency broadcast network.
- c. In addition, a teletype and facsimile printer linked to the DOT meteorological service will provide current weather information.

SECTION 5—FALLOUT REPORTING POSTS

313. Role and Function

The primary role of fallout reporting posts is to measure fallout intensities and to maintain a flow of information at designated intervals following a nuclear detonation which affects their areas. A secondary role is to report nuclear detonations in their areas. These detonations will likely be of the "random-burst" variety not falling within target areas covered by NUDET reporting posts. Approximately 2,000 fallout reporting posts are required on a basis of one for each grid measuring 45 miles EAST and WEST and 15 miles NORTH and SOUTH throughout the populated areas of the country, with additional coverage adjacent to centres of population. Reporting posts will also be established in Northern Canada in centres where suitable communications are available.

314. Location and Manning

- a. The basic considerations which affect the manning of fallout reporting posts are:
 - (1) The need to provide thorough coverage.
 - (2) The need to have an organization in being and able to carry out its function at the outset of, and during an emergency.
 - (3) The need for fallout protection.
 - (4) Preference for the use of organizations with communication networks not dependent on unprotected landline or microwave.

- (5) Integrity and dependability of the individuals employed in the organization.
 - (6) The need for financial and manpower economy.
- b. Based on these considerations it is considered that:
- (1) Maximum use should be made of existing federal and, in certain cases, provincial government departments and agencies.
 - (2) Independent communication networks, where they exist in the above agencies, should be employed.
 - (3) Agencies should have a 24-hour, 7-day-a-week manning requirement for the fulfilment of their normal role to ensure manning in an emergency.
 - (4) In an emergency the departments and agencies should be in a position to render this service without prejudice to their other duties. In some cases the additional role will contribute to the effective operation of the agencies concerned in the time of an emergency.
- c. The employment of elements of the following departments and agencies will provide the most effective and economical means of manning the required fallout reporting posts:
- (1) Department of National Defence.
 - (2) USAF manned air defence installations in Canada.
 - (3) Department of Justice (RCMP).
 - (4) Department of Transport (airway installation, weather reporting stations, etc).
 - (5) Provincial Police (where RCMP do not undertake provincial duties) .
 - (6) Provincial Lands and Forests Departments.
 - (7) Railway division or section installations.
- d. A hypothetical network of fallout reporting posts is illustrated in plate 5.
- e. In determining the number of reporting posts necessary to provide national coverage, and in selecting appropriate agencies to carry out these functions, the more heavily populated sections of Canada have been separated from those areas of lower density as follows:
- (1) *The Northern Section.* That area north of the 55th parallel from the Pacific coast to the Manitoba/Ontario border, then along the border to the 50th parallel, and along that parallel to the Atlantic coast.
 - (2) *The Southern Section.* That area south of the boundary defined in (1) above.

- f. In the northern section there are approximately 200 permanently manned DND, DOT, RCMP and USAF installations at separate locations, linked by existing independent communication networks. As there are no other agencies of appreciable size in this territory, other than those manned by the above departments, these installations should be incorporated into the reporting system.
- g. In the southern section the coverage required by the 15 x 45 mile grid can be obtained by incorporating into the system DND, DOT, RCMP and provincial police installations; other federal and provincial installations; and selected railway and utility installations.

315. Equipment

- a. Fallout reporting posts need sufficient equipment to carry out the functions of reporting fallout conditions and providing data to assist in the location of nuclear detonations in areas not covered by NUDET reporting posts. Instruments to measure personal exposure are also required. Equipment needs are:
 - (1) Radiacmeter gamma survey remote 1
 - (2) Detectors radiac tactical dosimeter 3
 - (3) Position of burst and yield indicator 1

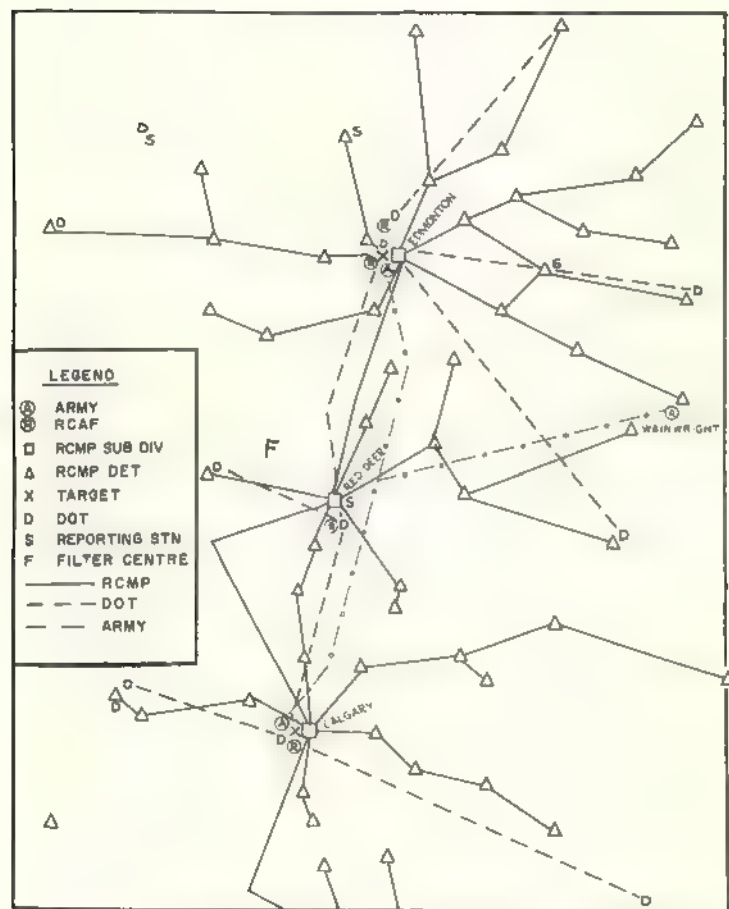
316. Communications

It is envisaged that individual reporting posts will use the communications associated with their primary functions. Special equipment will not be provided. Co-ordination of transmission of data will be necessary but this will not apply at the individual reporting post level (see paragraph 322).

317. Operating Procedures

- a. The procedures for the operation of the individual reporting posts and the transmission of data to the nuclear analysis and prediction centres will vary in relation to the location and size of areas being covered and the agencies employed.
- b. *In the Northern Section*—the participating agencies maintain their own respective communications systems and it should be feasible to collect these reports at terminal centres such as Edmonton, Churchill, Goose Bay, etc and retransmit the data to the closest PWC over military networks.
- c. *In the Southern Section*—varying routes of transmission will be required to suit the basis of manning:
 - (1) DND installations will direct their reports to the closest element of the CASS or the provincial warning network for onward transmission to filter centres or PWCs.

-NDFRS-
ILLUSTRATION CENTRAL ALBERTA
 (HYPOTHETICAL ONLY)



- (2) DOT installations will route messages over their own networks to a location where messages can be transferred to the CASS which will then carry them to the filter centre or PWC.
- (3) In those provinces where the RCMP have provincial jurisdiction their normal command channels from detachment to sub-division should be maintained with communication links to filter centre or PWCs as appropriate.
- (4) The Ontario and Quebec provincial police will be able to transmit reports to the army filter centres. Communications will also exist between provincial police and parent provincial government agencies located with the Army in alternate locations.
- (5) The railway companies, or other utilities, in areas where their assistance has been requested, will channel their reports over their normal operation links to the closest police or army establishments.
- (6) The detailed procedures for passing radiation plots and for identification of reporting stations require close co-ordination. This can best be carried out at the provincial level between the responsible army commander and the representatives of the agencies and departments concerned.

SECTION 6—FILTER CENTRES

318. Role and Function

- a. Filter centres are required in some provinces as component elements in the reporting system. They are designed to reduce the amount of traffic being transmitted to nuclear analysis and prediction centres. Their function is to monitor all or a portion of the reports initiated by fallout reporting posts within their provinces to:
 - (1) Reduce traffic.
 - (2) Collate individual reports.
 - (3) Expedite transmission.
 - (4) Prepare and maintain area fallout coverage diagrams.
 - (5) Examine and plot initially the reports of nuclear detonations received from agencies other than NUDET reporting posts.
 - (6) Transmit filtered data to nuclear analysis and fallout prediction centres.
- b. The necessity for establishing filter centres will depend upon the amount of traffic within the province and the necessity for intermediate display of information. NDFRS in a province is illustrated at plate 6.

- c. For ease of manning, for provision of communications, and for co-ordination with participating agencies, filter centres are established in accordance with the following:
 - (1) Located outside target areas.
 - (2) Based on existing DND (Army) installations.
 - (3) Located at installations with secure communications to PWCs.
 - (4) Organized in locations adjacent to operational HQ of major participating agencies
 - (5) Accommodated in buildings providing a measure of fallout protection.
- d. The final selection of suitable locations for filter centres will be made by the responsible army commanders in conjunction with the representatives of participating agencies at the provincial level. Examples of suitable locations for filter centres are:

Ontario

Camp Borden—Army Garrison adjacent to Ontario provincial police district HQ at Barrie.

Kingston —Army Garrison and Ontario provincial police district HQ.

319. Manning

Filter centres need not be manned in peace time but allocation of accommodation, provision of equipment, earmarking and training of personnel and checking of communications will be completed prior to the establishment of the fallout reporting system.

320. Equipment

- a. To permit operation under emergency conditions a degree of fallout proofing of accommodation is necessary. Issues of personal protective devices and remote radiac instruments are also required. The following equipment is provided:

(1) Radiacmeter, gamma survey remote	1
(2) Radiacmeter, tactical dosimeter O-600r	13
(3) Radiacmeter, technical dosimeter O-10r ...	13
(4) Chargers, radiac dosimeter tactical	1
(5) Detectors, radiac tactical dosimeter	45
(6) Computers indicator radiac tactical dosimeter	1
(7) Position of burst and yield indicator	1

321. Communications

The basing of filter centres on existing DND (Army) installations will reduce the need for independent means of communications to provincial nuclear analysis and prediction centres, by making use of CASS networks and the provincial warning network. Local links will be provided between filter centres and other participating agencies, eg, RCMP and provincial police.

SECTION 7 --FEDERAL NUCLEAR DATA COLLECTION CENTRE

322. **Role and Functions**

This centre operates as a component of the federal warning centre. Its primary functions are to receive detonation and intensity reports from the provincial analysis and prediction centres, to collate and display nuclear detonation data, and to advise senior government and military officials as the situation develops.

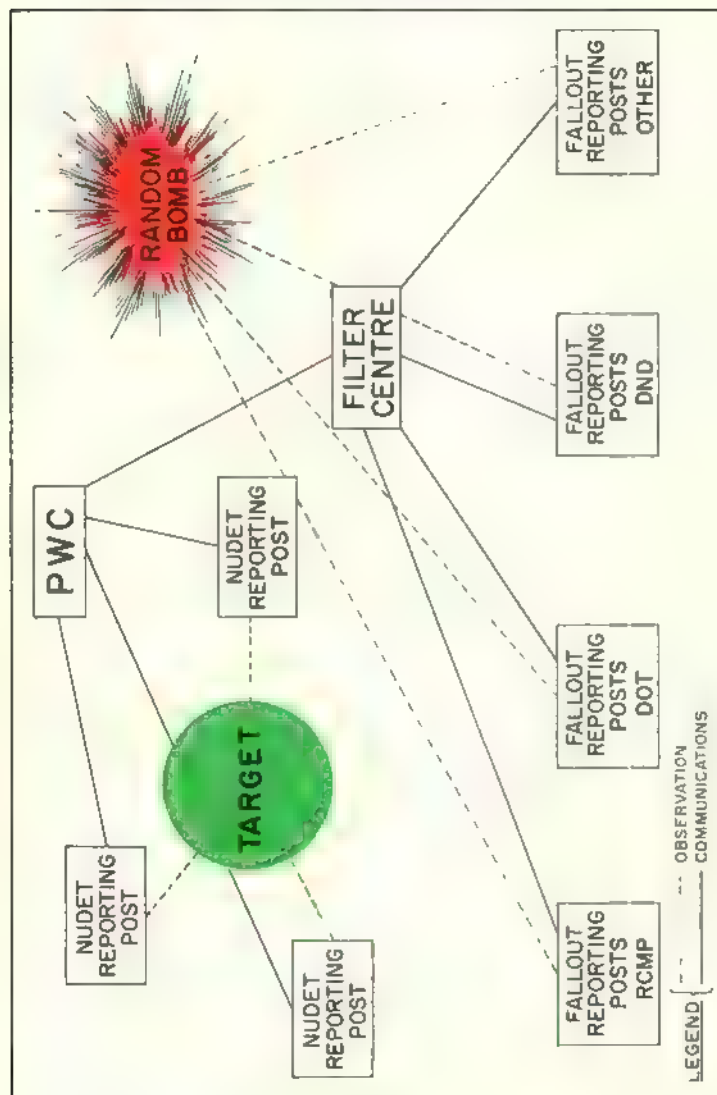
323. **Manning**

Manning in both peace and war will be on a full-time basis.

324. **Communications**

Transmission of detonation and fallout data to the federal collection centre will be a normal function of the warning system and the CASS.

NDFRS IN A PROVINCE



CHAPTER 4

ORGANIZATION FOR RE-ENTRY

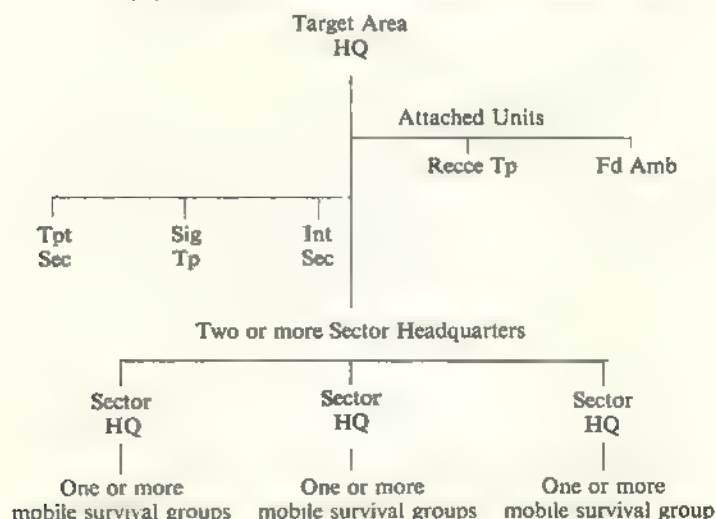
SECTION 1—INTRODUCTION

401. General

- a. The Army is responsible for the conduct of re-entry operations into a target area. It is appreciated, however, that the Army cannot do this alone. It must have the backing of federal, provincial and municipal emergency measures organizations and the assistance of civilian rescue groups.
- b. It is assumed that emergency plans are in existence in municipalities and that a programme of education and information has been conducted for the public.
- c. In the same way it is assumed that there will be a provincial emergency measures authority and a provincial emergency measures plan which could be put into immediate operation. Local governments would have organized emergency services to support the Army in its task.

402. Military Organization

- a. The purpose of this chapter is to provide a general working knowledge of the military organization for re-entry operations in a target area. For purposes of command and control the target area is divided into sectors and sectors may be further divided into sub-sectors. The organization consists of a target area headquarters, target area headquarters units, a number of sector headquarters and a number of survival groups as shown:



- b. The establishments of individual headquarters and units are included as a guide only and serve to indicate the general organization.
- c. Deployment and detailed tasks for re-entry operations are covered in chapter 5.

SECTION 2—TARGET AREA HEADQUARTERS

403. General

The target area headquarters is responsible for planning and conducting re-entry operations into the target area. This will include establishing sectors, allocation of resources to sectors and the control of all movement into and out of the target area. It will co-ordinate its planning with the federal, provincial and municipal governments, and in the event of attack on the city, it will become the site of government, if the existing government is destroyed, until such time as civil authority can be restored. The target area headquarters is manned in peace time by a skeleton staff which is responsible for collecting and maintaining the necessary data on which to base re-entry operations.

404. Organization

- a. An organization of a target area headquarters is shown below:

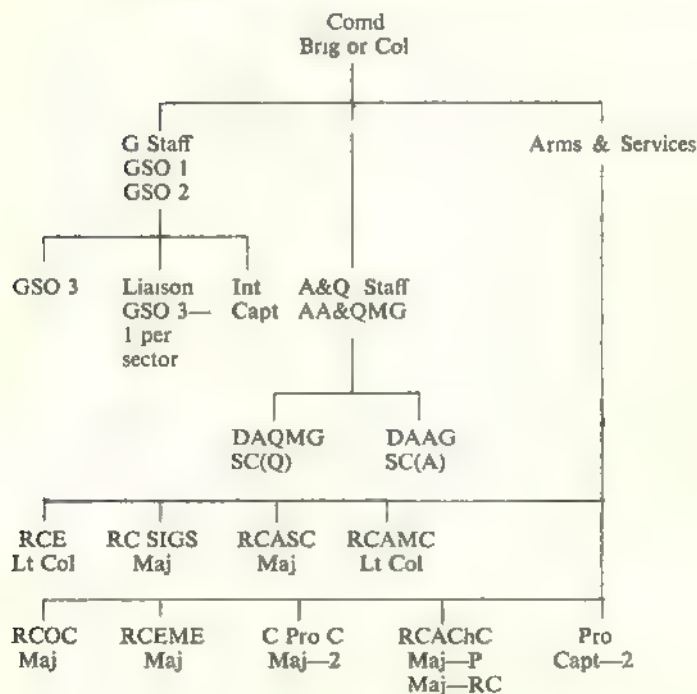
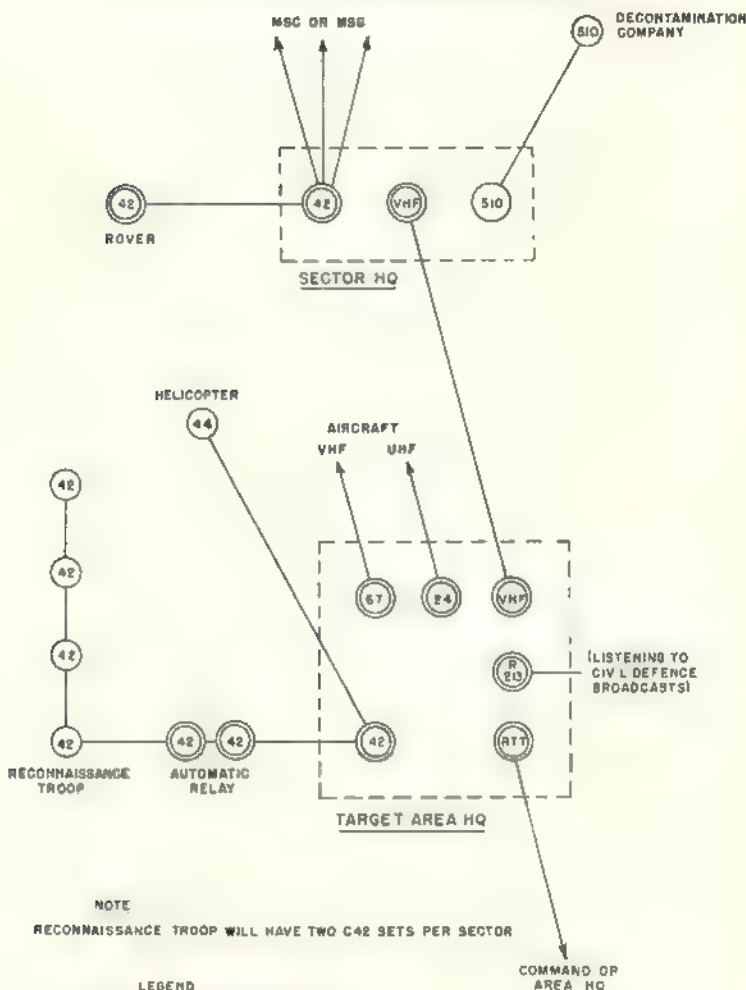


PLATE 7

TARGET AREA AND SECTOR HQ RADIO DIAGRAM



LEGEND

- VHF - VERY HIGH FREQUENCY
UHF - ULTRA HIGH FREQUENCY
AM - AMPLITUDE MODULATION
FM - FREQUENCY MODULATION
① - RADIO SET OPERATED BY THE ROYAL CANADIAN CORPS OF SIGNALS
② - RADIO SET OPERATED BY OTHERS
24 - AN/VRC 24 SET - GROUND TO AIR, UHF AM TRANSMITTER RECEIVER
42 - C42 SET - 16 MILE VHF FM TRANSMITTER RECEIVER
44 - AN/ARC 44 SET - GROUND TO AIR, VHF FM TRANSMITTER RECEIVER
67 - AFICA 67 SET - GROUND TO AIR, VHF AM TRANSMITTER RECEIVER
510 - AN/PRC 510 SET - 5 MILE FM TRANSMITTER RECEIVER
R213 - RADIO RECEIVER
RTT - RADIO TELETYPE

- b. A civilian component will be located at the target area headquarters to permit close co-operation between civil and military authorities. It will include representatives of federal, provincial and municipal governments, municipal utilities and services, health and welfare services, and others. The types of municipal emergency services and their proposed principal responsibilities are outlined at Annex C. This outline cannot be considered complete for any specific municipality and is issued only as a guide.

405. Communications

A target area headquarters radio diagram is shown at plate 7.

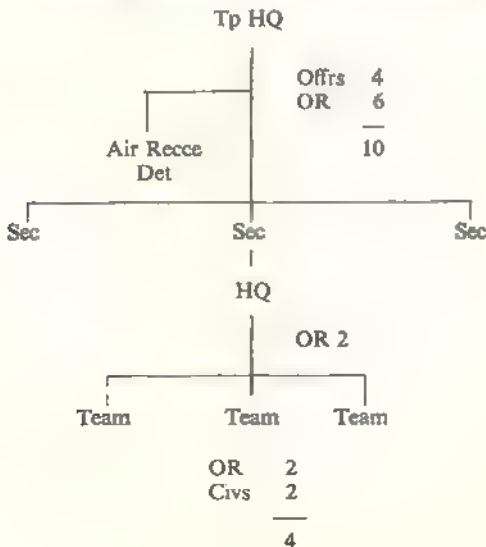
SECTION 3—RECONNAISSANCE TROOP

406. Role

- a. The role of the reconnaissance troop is to determine the general situation by air and ground reconnaissance. Specific tasks are:
- (1) Establish radiation intensity lines (GREEN and RED).
 - (2) Determine accessibility of routes.
 - (3) Report the fire pattern.
 - (4) Report damage and casualties.

407. Organization

The reconnaissance troop consists of a troop HQ, which includes an air reconnaissance detachment, and two to four sections, depending on the number of sectors in the target area. A three-section reconnaissance troop comprises the following:



Summary

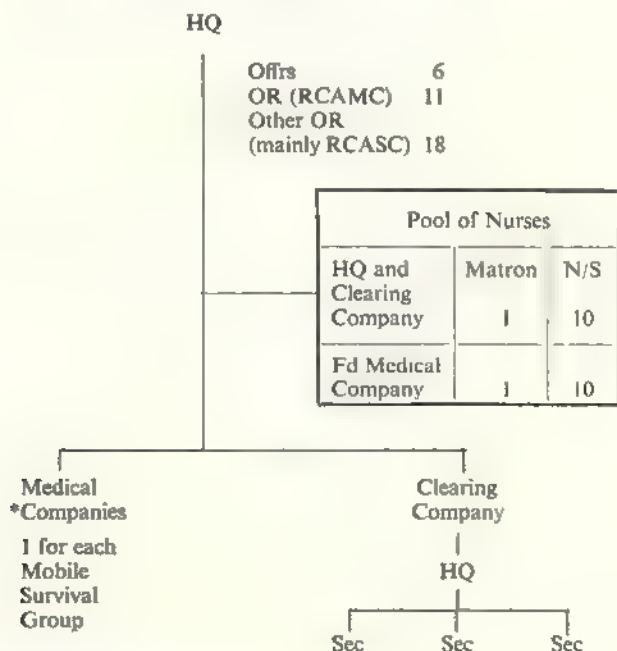
—	Offrs	OR	Civs	Total
Tp HQ	4	6	—	10
Sec HQ(3)	—	6	—	6
Teams (9)	—	18	18	36
TOTAL	4	30	18	52

SECTION 4—THE FIELD AMBULANCE**408. Role**

The role of the field ambulance is to sort casualties and provide initial care. It will form ambulance stations as required on the periphery of a damaged area.

409. Organization

- a. The field ambulance comprises a headquarters, a clearing company and a number of field medical companies (one per mobile survival group) as shown:



*Covered separately under mobile survival group.

Summary

	Offrs	Nurses	OR(RCAMC)	OR(Other)	Total
HQ	6	1	11	18	36
Clearing Coy	5	10	61	22	98
Fd Med Coys(3)	18	33	171	132	354
TOTAL	29	44	243	172	488

410. Characteristics

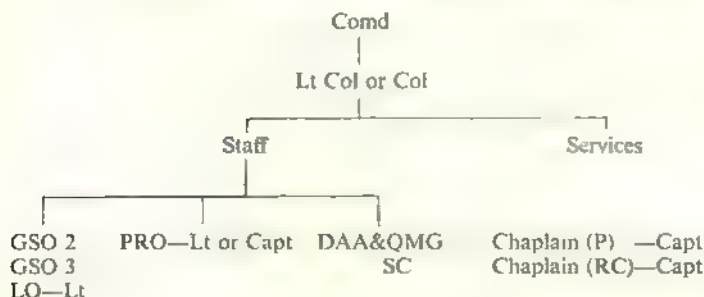
The field ambulance is completely mobile and administratively self-contained. The headquarters and each company have the capacity to operate while separated from the remainder of the unit. The ambulance sections and clearing sections can operate independently for short periods.

SECTION 5—SECTOR HEADQUARTERS**411. General**

The sector headquarters commands the re-entry operations of the mobile survival columns or groups allotted to the sector, controls specialist units and services allotted to the sector and, under direction from target area headquarters, is responsible for liaison with and direction of fire, police and municipal services in its sector. It will be formed from existing regular and militia units in the area.

412. Organization

- a. When only one survival group is deployed in a sector, its headquarters will be augmented to form sector headquarters (see para 417). Where two or more survival groups are deployed, a separate sector commander and headquarters are required. This headquarters will include a signal element, a small housekeeping staff and sufficient transport and drivers to be completely mobile. A line diagram of a sector headquarters is shown below:



- b. Additional service advisers will be drawn from support units under command. A civilian component will also be located at sector headquarters.

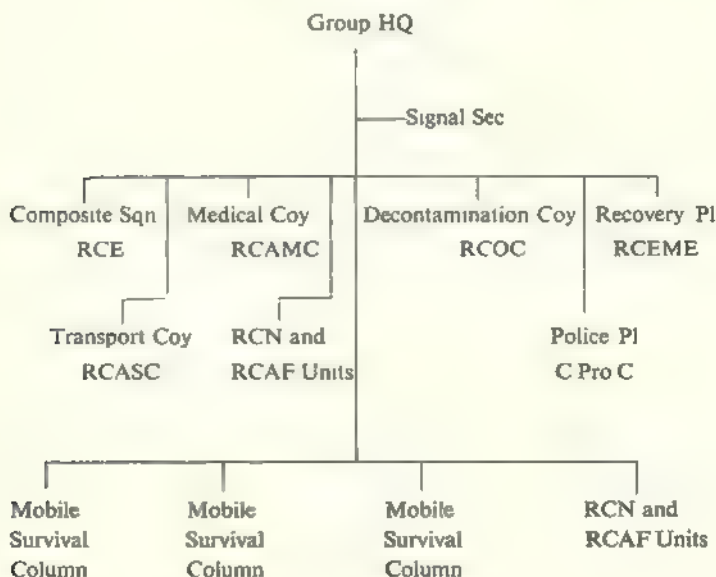
SECTION 6—The Mobile Survival Group

413. General

The mobile survival group is the basic organization for survival operations. It is not a fixed organization but a convenient grouping of normal military units and sub-units, each of which has an establishment. It consists of a number of basic rescue units and supporting arms and services. Some of these components will comprise purely military units of the Regular Army while a great many will consist of cadres from both regular and militia units. The cadres will form the basis of the command elements and will provide communications personnel and specialists not available from civilian sources. Through planning with local authorities it should be possible to arrange for the support required in an emergency. The cadres will provide the planning and control organization to employ these resources to the best advantage.

414. Organization

- a. The mobile survival group comprises a headquarters, from one to four mobile survival columns, a composite squadron (RCE), a transport company, a medical company, a decontamination company, a police platoon and a recovery platoon (RCME) as shown;



- b. Support units are built of sub-sections or bricks with one sub-section for each column in the group. The organization of support units will therefore vary accordingly.
- c. Where there is more than one survival group in a sector, support units are organized under sector control and, in many cases, only elements of these units will be operating in the survival group sub-sector.
- d. Units supplied by RCN and RCAF would be added as shown in the diagram provided that their training and equipment would allow them to take their place in this way.

415. **Role**

The primary role of the mobile survival group is the conduct of re-entry operations. In addition it must be prepared at all times to assist in the maintenance of law and order.

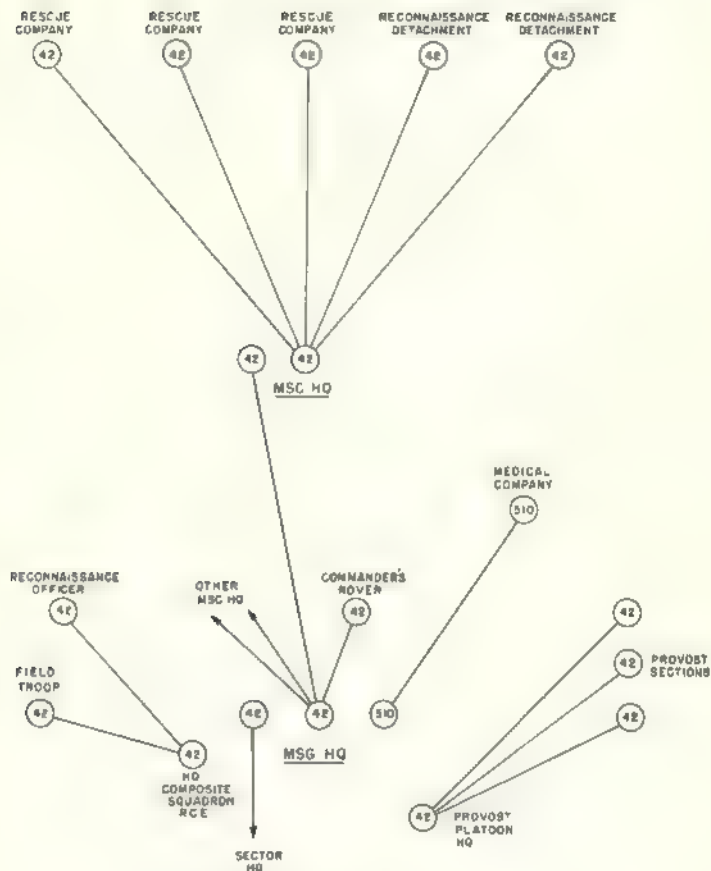
416. **Communications**

- a. The primary means of communication is by radio, with the following nets being provided:
 - (1) Command net, including reconnaissance
 - (2) Provost net
 - (3) Engineer net
 - (4) Medical net.
- b. A typical radio diagram is shown at plate 8.

SECTION 7—THE MOBILE SURVIVAL GROUP HEADQUARTERS

417. The main function of the mobile survival group headquarters is to command and control the re-entry operations of the mobile survival columns placed under it. Where only one mobile survival group is allotted to a sector, its headquarters will be augmented to form sector headquarters and, in addition to commanding all specialist arms and services allotted to the sector, will have the additional responsibility of directing police, fire and municipal services in the sector.

418. The headquarters will normally be formed by the existing headquarters of an armoured or artillery regiment, an infantry battalion or, in some cases, by a militia group headquarters. As the MSG consists of units of several arms and services it may be desirable to fill some appointments from the supporting arms and

MOBILE SURVIVAL GROUP RADIO DIAGRAM

NOTE

IN SMALLER TARGET AREAS THERE WILL BE NO MSG HQ AND
ENGINEER, MEDICAL AND PROVOST COMMUNICATIONS WILL
BE BASED ON SECTOR HQ

LEGEND

42 — 15 MILE VHF FM TRANSMITTER RECEIVER

510 — 5 MILE VHF FM TRANSMITTER RECEIVER

FOR OTHER DETAILS SEE PLATE 7

services. The suggested table of organization shown below therefore gives the organization and appointments as if it were a formation headquarters.

Commanding Officer, Lieutenant-Colonel.....	1
GSO 2, Major.....	1
DAA&QMG, Major.....	1
GSO 3, Captain.....	1
Staff Captain A & Q, Captain.....	1
Signal Officer, Captain.....	1
Medical Officer, Captain.....	1
<hr/>	<hr/>
Total Officers.....	7

Warrant Officer Class 1.....	1
Staff-sergeant (Clerk).....	1
Sergeants (1 Clerk, 1 Tpt duty).....	2
Sergeants (RCAMC) (Medical Assistant).....	1
Corporals (1 Clerk, 1 Tpt duty).....	2
Corporals (RC Sigs) (2 Radio Eqpt Techs, 2 R and Tg Ops).....	4
Privates (1 Clerk, 2 Drivers).....	3
Signalmen (2 Radio and Eqpt Techs, 2 R and Tg Ops).....	4
<hr/>	<hr/>
Total Other Ranks.....	18
<hr/>	<hr/>
Total All Ranks.....	25

SECTION 8—THE MOBILE SURVIVAL COLUMN

419. Role

The primary role of the mobile survival column is to rescue the trapped and provide limited first aid to the injured. It can conduct all rescue operations except those requiring heavy equipment or expert personnel. Its equipment is man-portable. It has no facilities for administrative or logistic support of the operation and cadre columns (see paragraph 420) have no organic transport to lift the rescue workers.

420. Organization

- a. The mobile survival column is based on the organization of an infantry company expanded to include additional rescue personnel. Regular army columns may be either all military or military cadre units. The following diagram shows the organization of a mobile survival column cadre with attached civilians. In a wholly military column the number of privates is increased by the number of civilians shown in this diagram.

COLUMN HQ (Incl recce det)

Commanding Officer, Major.....	1
Second-in-Command, Capt.....	1
Operations Officer, Lt.....	1
Company Sergeant-major, WO 2.....	1
Staff-sergeant (CQMS).....	1
Sergeants.....	2
Lance corporals.....	3
Privates.....	5
<hr/>	
Total Military.....	15
Civilians.....	8
<hr/>	
Total Military and Civilian.....	23

Rescue Coy HQ	Rescue Coy HQ	Rescue Coy HQ
Lieutenant.....	1	
Staff-sergeant.....	1	
Sergeant.....	1	
Lance corporals.....	2	
Privates.....	3	
<hr/>		
Total Military.....	8	
Civilians.....	4	
<hr/>		
Total Military and Civilian.....	12	

Rescue Pl HQ	Rescue Pl HQ	Rescue Pl HQ
Sergeant.....	1	
Corporals.....	2	
<hr/>		
Total Military.....	3	
Civilians.....	4	
<hr/>		
Total Military and Civilian.....	7	

Sec	Sec	Sec
Corporal.....	1	
Lance corporal.....	1	
<hr/>		
Total Military.....	2	
Civilians.....	12	
<hr/>		
Total Military and Civilian.....	14	

Summary

	Offrs	OR	Civs	Total
Column HQ	3	12	8	23
Coy HQ (3)	3	21	12	36
Pl HQ (9)	—	27	36	63
Secs (27)	—	54	324	378
TOTAL	6	114	380	500

- b. Cadre units are organized to absorb and direct the efforts of volunteers in rescuing the trapped and injured in the initial stages of the re-entry operation. The civilians included in the diagram are volunteer workers who are expected to offer their services in an emergency.

SECTION 9—THE COMPOSITE ENGINEER SQUADRON

421. Role

- a. The role of the composite squadron RCE is:
 - (1) To provide skilled personnel and equipment to carry out heavy rescue tasks in support of mobile survival columns.
 - (2) To conduct route clearance for the mobile survival group.
 - (3) To provide a potable water supply.
- b. The plant park troop of the squadron musters civilian engineering equipment in an emergency for use in support of squadron operations.

422. **Organization**

- a. The composite squadron is designed to serve three mobile survival columns. It comprises a squadron headquarters, a field troop, a plant operating troop, a plant park troop and one water section as shown:

				HQ			
				Offrs	3		
				OR	14		
				Civs	9		
				Total	26		
Fd Tp		Plant Op		Plant Pk		Water Sec	
		Tp		Tp			
Offr	1	HQ		Offrs	3	OR 2	
OR	17			OR	6	Civs 3	
Civs	51	Offrs 3		Civs	3	5	
	69	OR 9			12		
		12					
		Secs (6)				Plant RVs (10)	
		Each	OR 5			Each	OR 5
		Civs	16				5
			21				
Total Plant Op Tp				Total Pk Tp			
Offrs	3			Offrs	3		
OR	39			OR	56		
Civs	96			Civs	3		
	138				62		

Summary

--	Offrs	OR	Civs	Total
Sqn HQ	3	14	9	26
Fd Tp	1	17	51	69
Plant Op Tp	3	39	96	138
Plant Pk Tp	3	56	3	62
Water Sec	--	2	3	5
TOTAL	10	128	162	300

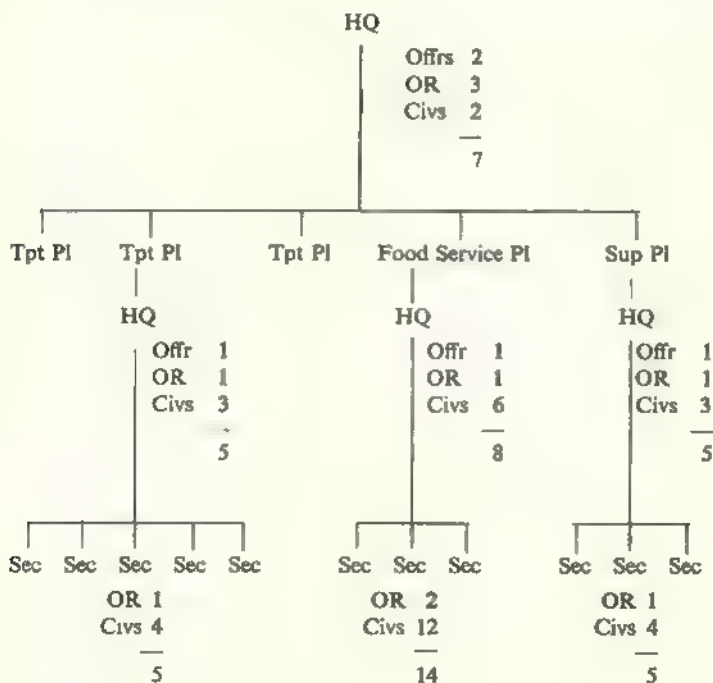
SECTION 10—THE TRANSPORT COMPANY

423. Role

- a. The role of the transport company is:
- (1) To provide cooked rations for all personnel of the mobile survival group.
 - (2) To provide transport for the mobile survival columns.
 - (3) To provide POL for the survival group.
- b. The transport will be mainly civilian which has been earmarked in peace for this use by the federal transport agency.

424. Organization

- a. The transport company is designed to serve three mobile survival columns. It comprises a headquarters, three transport platoons, a food service platoon and a supply platoon as shown:



Summary

—	Offrs	OR	Civs	Total
HQ	2	3	2	7
3 Tpt Pls	3	18	69	90
Food Service Pl	1	7	42	50
Supply Pl	1	4	15	20
TOTAL	7	32	128	167

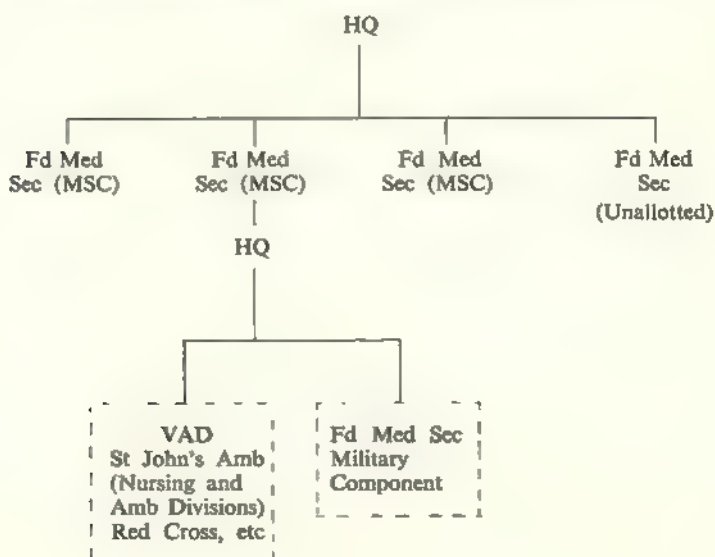
- b The number of transport platoons and the number of sections in the food service and supply platoons may be increased or decreased to correspond with the number of MSCs in the group.

SECTION 11—THE MEDICAL COMPANY**425. Role**

The role of the medical company is to sort casualties and provide very limited initial treatment.

426. Organization

The medical company comprises a headquarters and four field medical sections as shown:



Summary

Offrs	Nurses	OR (RCAMC)	OR (Other)	Total
6	11	57	44	118

SECTION 12—THE DECONTAMINATION COMPANY

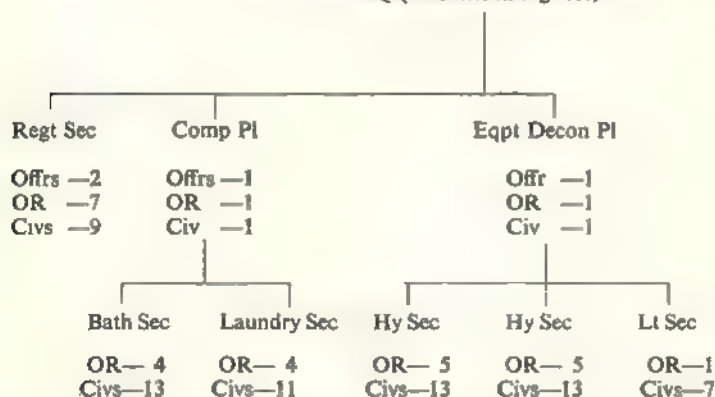
427. Role

The role of the decontamination company RCOC is to provide facilities for complete decontamination of all personnel, equipment and vehicles of rescue columns and decontamination (bathing facilities) for civilian survivors as required.

428. Organization

The decontamination company is provided on the basis of one for each sector of a target area, each company being designed for its specific sector. As a result companies vary in size from 50 to 300. All companies comprise a regimental section and bath, laundry and equipment decontamination sections which vary in number in relation to the size of the sector. A typical company for a sector of a target area city of approximately 300,000 is shown below:

HQ (Pers incl in regt sec)



Summary

—	Offrs	OR	Civs	TOTAL
HQ and Regt Sec	2	7	9	18
Comp Pl	1	9	25	35
Eqpt Decon Pl	1	12	34	47
Total	4	28	68	100

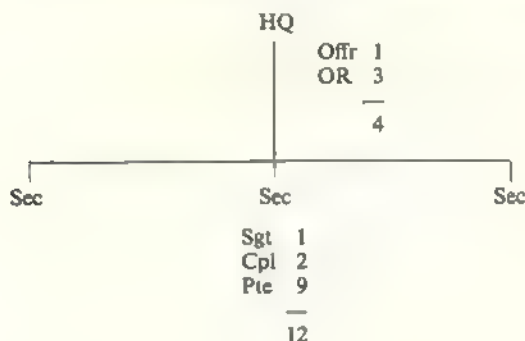
SECTION 13—THE POLICE PLATOON

429. **Role**

- a. The police platoon will be supplied by provost platoons of the C Pro C, both regular and militia, and by civilian policemen operating under military direction. Its role is:
- (1) To provide traffic, evacuee and crowd control.
 - (2) To carry out security duties.
 - (3) To assist in the maintenance of law and order.

430. **Organization**

- a. The police platoon is designed to support three mobile survival columns. It normally comprises a headquarters and three sections as shown:

**Summary**

—	Offr	OR	Total
HQ	1	3	4
Secs		36	36
TOTAL	1	39	40

- b. The number of sections may be increased depending on number and length of routes.

SECTION 14—THE RECOVERY PLATOON

431. **Role**

The primary role of the recovery platoon is to provide limited route clearance on priority established by sector headquarters. It

also calibrates radiac equipment and may as circumstances permit provide limited heavy lift assistance for the engineer squadron.

432. Organization

- a. The recovery platoon is designed to support three mobile survival columns. It normally comprises a headquarters, a headquarters section and two recovery sections as shown:

HQ		
	Offr	1
	OR	0
	Civ	1
		<hr/> 2
HQ Sec	Rec Sec	Rec Sec
Offr 0	Offr 0	Offr 0
OR 4	OR 2	OR 2
Civ 0	Civs 4	Civs 4
<hr/> 4	<hr/> 6	<hr/> 6

Summary

	Offr	OR	Civs	Total
HQ	1	0	1	2
HQ Sec	—	4	—	4
Rec Secs (2)	—	4	8	12
TOTAL	1	8	9	18

- b. The number of sections may be increased depending on number and length of routes.

CHAPTER 5

RE-ENTRY OPERATIONS IN A TARGET AREA

SECTION 1—INTRODUCTION

501. General

The aim of re-entry operations in a damaged area is to save lives. Speed in the establishment of control on the scene and speed in bringing the maximum number of rescuers to bear at the earliest possible moment are the prime requisites of a re-entry plan.

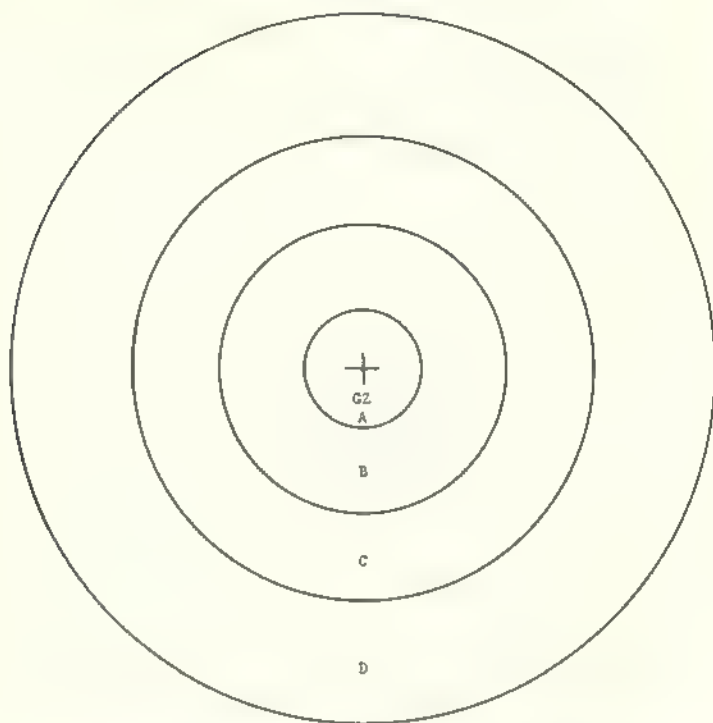
502. Concept of Operations

- a. In the event of attack reconnaissance will begin immediately. As rescue companies, or even platoons, of designated mobile survival columns adjacent to the target area become operational, they will proceed independently on their allotted routes towards the damaged area in accordance with the rehearsed re-entry plan.
- b. On the basis of nuclear detonation reports and information from reconnaissance, both ground and air, the target area commander will confirm or adjust his plans and give directions to those militia and regular units that are still on their way to the scene of operations. Most units will not arrive before the target area commander has had time to complete reconnaissance and plan their employment. In particular he will plan the employment of his support units.
- c. In the target area there will be a region of very heavy damage in the neighbourhood of ground zero. Within this area there will be few survivors. At greater distances from ground zero damage will be less and there may be considerable numbers of persons trapped in wreckage by the collapse of buildings. On the fringe of the area affected by the explosion there will be no more than light damage to structures, although there may be some casualties from heat and blast effects. Damage zones are defined in plate 9 which illustrates effects of a 5-megaton burst. Radii of damage for 1, 5 and 10-megaton weapons at different heights of burst are at plate 10. Thermal effects for a 5-megaton burst under given weather conditions are shown at plate 11.
- d. Within much of the area where rescue operations are necessary roads will be blocked by debris. Survival columns may therefore have to enter the operational area on foot. As long as access routes are blocked casualties must be evacuated by hand carry, and rescuers

will be limited to the use of portable equipment. Consequently, high priority must be given to clearance of routes.

- e. Mobile survival groups will deploy on the outer edge of the area of damage and will work towards the centre. First priority will normally be given to the areas of lighter damage since it is here that a concerted effort is likely to yield the greatest saving of life. Rapid reconnaissance and planning are necessary if rescue resources are to be used to full advantage. Since a concentrated rescue effort in the first few hours will be far more effective than a greater effort later, all available rescue forces will be committed at the outset. No attempt should be made initially to hold a reserve. At all times the guiding principle must be to use available effort in such a way as to produce the greatest possible saving of life. At the same time rescuers are not likely to do continuous rescue work effectively for more than 12 hours without food and rest.
- f. The radiation dose to which personnel are exposed will be kept to the minimum compatible with the importance and urgency of the operation.

RADII OF BLAST DAMAGE — 5-MT WEAPON
(Surface Burst)



A — 2-MILE RADIUS

COMPLETE DESTRUCTION—ALL PERSONNEL
KILLED

B — 5-MILE RADIUS

DAMAGE BEYOND REPAIR TO VIRTUALLY ALL
BUILDINGS

C — 8-MILE RADIUS

MAJOR REPAIRS REQUIRED

D — 12-MILE RADIUS

HOUSES AND BUILDINGS DAMAGED BUT
HABITABLE.

NOTE:

1. VARIOUS FORMS OF VERY LIGHT DAMAGE, eg, BROKEN WINDOWS, WILL EXTEND AS FAR AS 30 MILES FROM GZ.

ESTIMATED RADII OF DAMAGE IN MILES
TO VARIOUS TYPES OF STRUCTURES

SERIAL	TYPE OF STRUCTURE	TYPE OF DAMAGE (1)	1 MT		5 MT		10 MT	
			Surface	Air	Surface	Air	Surface	Air
1	Wood Frame Bldgs.	A B C D	2.9 3.9 6.5 15	4.0 4.9 7.0 17	5.0 6.5 11.5 25	6.8 8.5 12 29	6.3 8.5 14.5 32	8.6 10.5 15 37
2	Light Steel Frame Industrial Bldgs, One Storey, Light Walls	A B C D	2.3 3.1 6.0 18	3.2 4.2 6.0 17	4 5 10 30	5.5 7 10 29	5 6.5 13 38	6.9 9 13 37
3	Multi-storey Wallbearing Brick Bldg, Apartment House Type	A B C D	2.1 2.6 4.1 15	2.9 3.3 14 17	3.6 4.5 7.0 25	5.0 5.5 7.0 29	4.5 5.5 9.0 32	6.0 7.0 9.0 37
4	Multi-storey Reinforced Concrete Bldg, Concrete Walls, Small Windows	A B C D	1.5 2.1 3.1 15	— 2.7 3.3 17	2.6 3.5 5.0 25	— 4.6 5.5 29	3.3 4.4 6.5 32	— 6.0 7.0 37
5	Heavy Steel Frame One Storey Industrial Bldg. . . .	A B C D	1.9 2.2 3.7 18	— 2.0 3.3 17	3.2 3.8 6.5 30	— 3.4 5.5 29	4.0 4.8 8.0 38	— 4.3 7.0 37

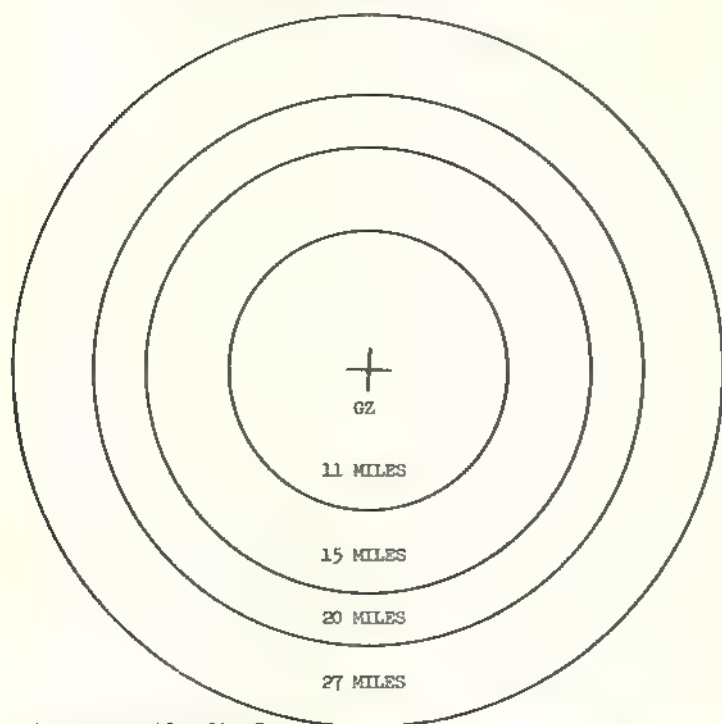
6	Multi-storey Steel Frame Office Bldg.....	A B C D	2.0 2.3 4.1 18	— 2.5 4.2 17	3.3 4.0 7.0 30	— 4.3 7.0 29	4.2 5.0 9.0 38	5.5 9.0 37
7	Multi-storey Reinforced Concrete Frame Office Bldg	A B C D	1.6 2.1 3.7 18	— — 3.3 17	2.7 3.7 6.5 30	— — 5.5 29	3.4 4.6 8.0 38	— — 7.0 37
8	Multi-storey Blast Resistant Reinforced Concrete Windowless Bldg	A B C D	0.8 0.9 1.7 2.0	— — — 1.0	1.3 1.5 2.9 —	— — 1.7 —	1.7 1.9 3.9 —	— — 2.2

NOTES: (1) A, B, C and D types of damage correspond to the rings of damage described in plate 9.

(2) Some structures do not sustain a specific type of damage such as type A or type B.

(3) This table is derived from OCDM Study "Nuclear Weapon Phenomena and Characteristics" and is based on "Effects of Nuclear Weapons—1957".

**THERMAL EFFECTS—5-MT WEAPON
(Air Burst)**



11 MILES—15 cal/cm²

IGNITION OF PAPER, CURTAINS AND LIGHT CLOTHING

15 MILES—10 cal/cm²

IGNITION OF PAPER, DRIED LEAVES,—THIRD DEGREE BURNS TO BARE SKIN.

20 MILES—3.5 cal/cm²

IGNITION OF SHREDDED NEWSPAPER—SECOND DEGREE BURNS.

27 MILES—1.2 cal/cm²

FIRST DEGREE BURNS TO BARE SKIN.

NOTES:

1. VALUES GIVEN ARE FOR VISIBILITY OF 12-15 MILES.
2. CONDITIONS OF CLOUD AND SNOW, BECAUSE OF REFLECTION, MAY DOUBLE VALUES SHOWN WHEN THE BURST OCCURS BELOW CLOUDS. SIMILARLY, RADIANT EXPOSURE WILL BE REDUCED CONSIDERABLY IF THE CLOUD IS BETWEEN THE BURST AND THE TARGET.

SECTION 2—PRE-ATTACK PLANNING**503. General**

- a. The disruption to communications that will result from a nuclear attack will make it difficult for a higher commander to influence the actions of his units for some time, perhaps as long as three hours. During this time control must be decentralized to units and sub-units. It is during this interval that vigorous action is most necessary.
- b. By means of a re-entry plan previously rehearsed, units must know what to do without special instructions other than the warning received by the public, or the actual attack itself. The plan must be made not only for the most likely contingency but must provide for less likely contingencies. The circumstances calling for any one particular course of action should be so clearly defined that there could be no possible confusion in the course to be followed at the time. Variations in fallout, assumed yield and ground zero will all affect the plan.
- c. By the time most units arrive on the scene, or at appointed rendezvous, the target area commander will have adjusted his re-entry plan.

504. Warning

- a. Two degrees of warning will be considered in planning:
 - (1) Tactical warning
 - (2) Strategic warning.
- b. Tactical warning is the more likely, and by far the most difficult from the military point of view. In this situation plans must provide for re-entry by the forces from normal peace-time locations. All targets are unlikely to be attacked at the same time, however, and the time lapse may be such that emergency assembly can be completed for some target areas.
- c. In the event of strategic warning the Government may authorize the deployment of existing regular forces from distant locations, or from inside target areas, to assembly areas near probable targets. Also authority may be given to call out and concentrate militia units at pre-selected assembly areas. This would enable almost all the military forces to be used effectively in the re-entry battle and it would be less difficult to plan their employment.
- d. Re-entry, as described in this chapter, is based on the worst case. Alternative plans must be made for the easier case when pre-attack deployment is authorized by the government or the degree of tactical warning permits emergency assembly.

505. Target Area Headquarters

- a. The target area headquarters will be manned by a skeleton staff in peace and a commander will be designated so that he can become completely familiar with his tasks. A successor to the commander will also be designated to replace him at an alternative headquarters.
- b. In preparation for its task the target area headquarters will collect and maintain up-to-date target data such as:
 - (1) Type of building construction
 - (2) Fire hazards
 - (3) Fire breaks
 - (4) Blast, fire and radiation prediction charts and overlays.
 - (5) Population densities and their daily and seasonal fluctuation pattern.
 - (6) Municipal utilities
 - (7) Access routes
 - (8) Obstacles to movement
 - (9) Lists of technicians and specially qualified personnel
- c. Target data will be distributed to sector headquarters and mobile survival groups for planning and operations.

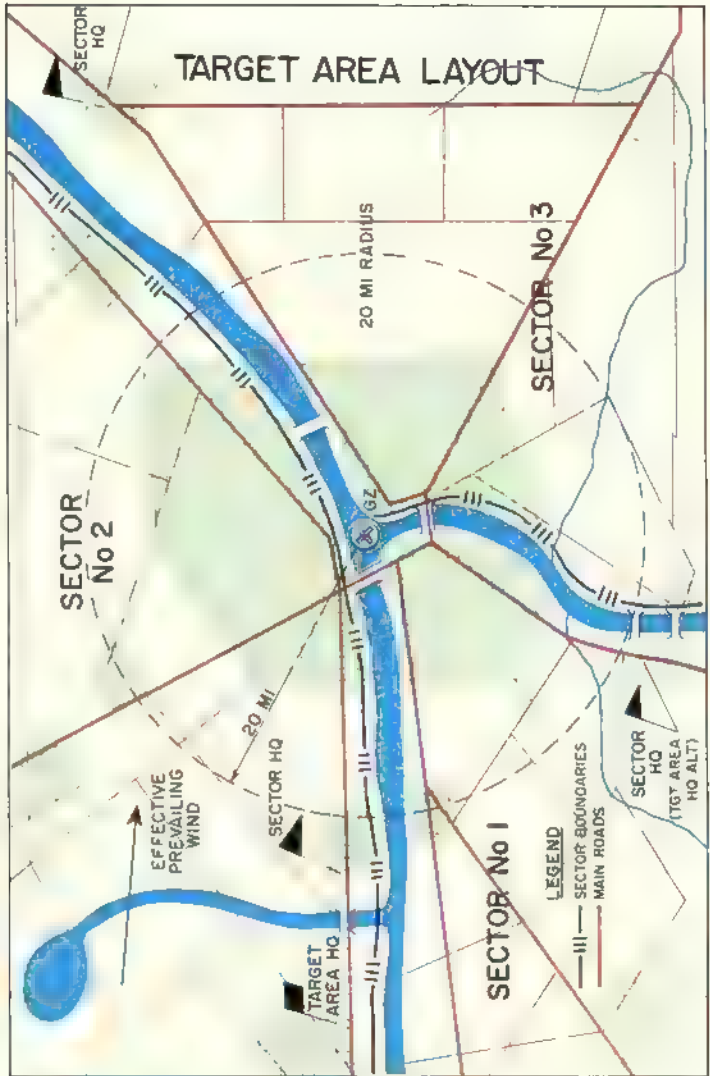
506. Deployment in the Target Area

a. *Target Area Headquarters*

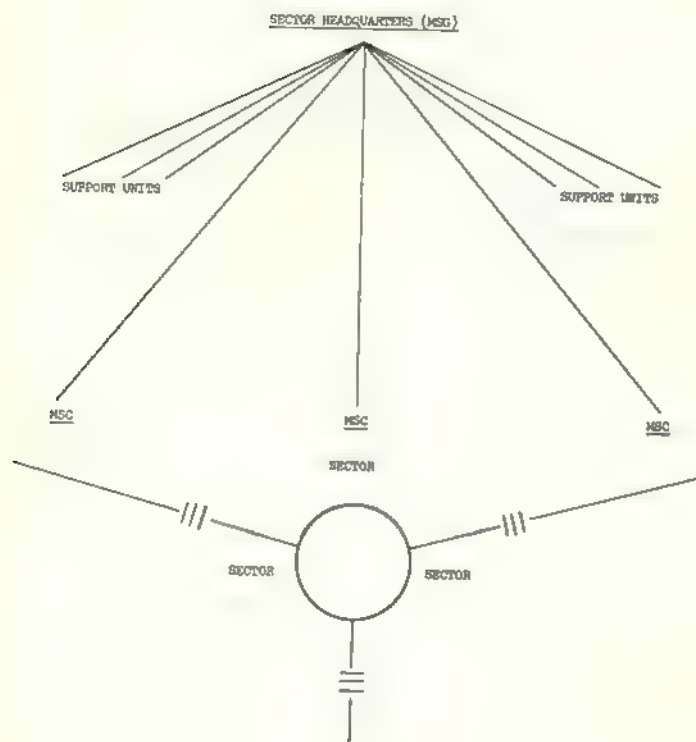
The target area headquarters will be situated as close to the target as safety will permit, possibly 20 to 45 miles from the centre of the target area. An alternative headquarters will be designated. It will normally be a sector headquarters far enough from target area headquarters so that one strike would not eliminate both.

b. *Division of Target Area into Sectors*

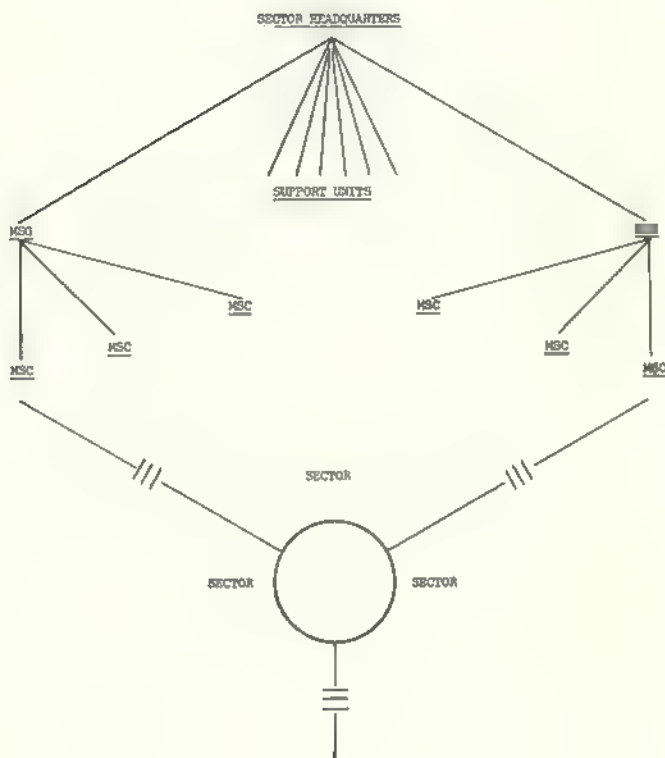
Most target areas are too large for one headquarters to control detailed re-entry operations and it will be necessary to divide them into sectors. The major determining factors are the number of primary access routes and geographical barriers to movement. The maximum number of primary access routes which can be cleared inside the rubble line is probably four. In many target cities, rivers or other geographical features divide the area into fewer than four sectors. In any case, even in the smaller target cities, there should be at least two sectors so that an off-centre strike, or an unusual wind, would knock out a single sector only. As a guide therefore target areas should be divided into two, three or four sectors in pre-attack planning. A typical layout of a target area is illustrated at plate 12. Command organization within a sector is illustrated at plates 13 and 14.



**SECTOR COMMAND ORGANIZATION
(ONE MSG IN A SECTOR)**



**SECTOR COMMAND ORGANIZATION
(MORE THAN ONE MSG IN A SECTOR)**



c. *Sectors and Sub-Sectors*

- (1) In sectors where more than one mobile survival group is to be deployed there will be a separate sector headquarters and the sector will be subdivided into mobile survival group sub-sectors.
- (2) Approach routes, assembly areas and the main axis of the advance into the target area will be designated for each mobile survival group.
- (3) The sector headquarters will control the deployment of all support units and will co-ordinate their work.
- (4) One of the sector headquarters in each target area will normally be designated alternative target area headquarters.

d. *Mobile Survival Groups* The mobile survival group will plan the conduct of re-entry operations within its sector or sub-sector. It will allot assembly areas (if necessary), areas of responsibility for rescue, and axes of advance into the target area to its mobile survival columns.

507. **Organization for Control**

a. *Control of Movement*

- (1) After a nuclear detonation most survivors will attempt to move as rapidly as possible to the outskirts of the area of operations. They will move on foot and in any type of vehicle available.
- (2) It is vital that movement of persons and vehicles out of and into the area of operations be controlled. Early and effective control is the only means of preventing chaos, which if allowed to develop, will greatly hinder the conduct of the re-entry operation. To effect this control a series of traffic posts must be planned at critical points along each route and their manning rehearsed in advance. Personnel selected to man these posts must be equipped with transportation, communications and radiation detection instruments. Their move to these posts must be automatic and as a guide the aim should be to establish a system of control within one-half hour of a nuclear strike. The control organization should extend well out from the target area, eg, up to 40 miles from the centre of the target in larger cities.
- (3) Evacuation routes should be selected beforehand and, in conjunction with them, staging areas to relieve pressure on the roads.
- (4) Line or radio communications will be needed between traffic control posts and the sector and target area headquarters.

- (5) Civilian police or army personnel stationed in the target area cannot be counted on to perform traffic control duties. The best that can be expected is that those who survive will eventually make their way to assembly areas or will join forces already taking part in re-entry operations. They cannot be regarded as an integral part of the control organization but may provide reliefs and reinforcements.
- (6) A traffic plan is illustrated at plate 15. Control of movement is covered in detail in Chapter 9.

b. Control in Initial Stages of Rescue

- (1) An additional problem will be control of the large numbers of people who converge on the scene of any disaster. It has been found that there are definite types of motivations of convergers—(1) the returners (2) the anxious (3) the helpers (4) the curious (5) the exploiters. Experience has also shown that a negative approach on the part of the authority—that is to restrict movement and to disperse the convergers—has usually been unsuccessful and that regardless of the motives for which they arrived many of these people carried out useful work especially when leadership, usually spontaneous, was provided. The aim in re-entry planning must be to provide this leadership on a planned rather than an unplanned basis.
- (2) Mobile survival columns adjacent to the target area will provide this initial control, assisted by any regular force or militia personnel among survivors and by members of the warden service, if one is in being. In accordance with the re-entry plan, and based on information contained in radio broadcasts to the public, elements of survival columns will move rapidly to the damaged area on pre-selected routes and begin rescue operations.
- (3) From the moment of attack there must be example and leadership in fighting the many minor fires that must be extinguished in a matter of minutes if they are not to spread rapidly and in the co-ordination of spontaneous rescue work that will commence immediately. Also there will be many bewildered people seeking medical care and welfare facilities. Regular and militia personnel living in the target area should be thoroughly briefed on re-entry plans so that they would be able to provide leadership especially in the control and direction of initial movement.

**TARGET AREA
TRAFFIC PLAN**

508. **Route Clearance**

a. *General*

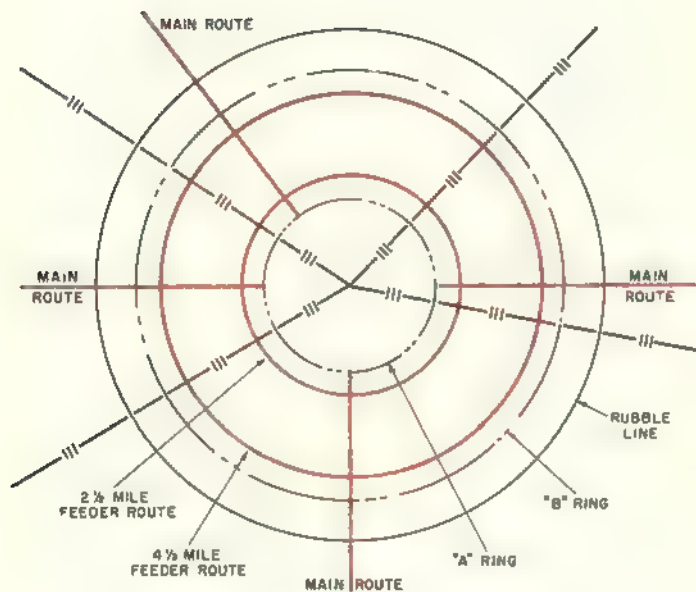
- (1) During re-entry, the following will need to enter the area inside the rubble line:
 - (a) Reconnaissance sections and radiation monitoring detachments.
 - (b) Fire fighters.
 - (c) Rescue companies, medical sections and heavy rescue equipment.
- (2) Route clearance must be carefully planned in the pre-attack period.

b. *Reconnaissance and Monitoring.* Some early reconnaissance will be carried out by aircraft. Other reconnaissance elements, and all monitoring parties, will be mounted in scout cars or jeeps and these small vehicles with their good cross-country performance should be able to get deep into the damaged area without assistance.

c. *Fire Fighting* Route clearance assistance for fire fighting vehicles will be required much sooner than it is likely to be available from normal army resources. Arrangements may be made in peace time for engineer plant from civilian resources to join fire services vehicles and move into the target area with them where they would work under fire service control until engineer route clearance parties arrived.

d. *Rescue Companies, Medical Sections and Heavy Rescue Equipment*

- (1) Studies indicate that the rubble line, as a general guide, will be just outside the B zone. Blocked routes, therefore, are not likely to delay rescue in C and D Zones but unless there is an adequate route clearance plan, the rescue of persons trapped in the B zone may be delayed. While rescue workers would be able to move in beyond the rubble line on foot with man-pack equipment for the first mile or so, much time will be wasted if they have to continue to operate long distances from the roadhead, especially if they have to carry casualties back to the road. Furthermore, in the B zone will be found the difficult rescues needing engineer plant. Route clearance is essential to get this equipment forward.
- (2) Accepting as a general rule that rescue will begin in the D zone and work progressively inward it will be some time before route clearance and heavy equipment are necessary to aid rescue. Plans should aim at having heavy equipment in action to clear routes by the time rescue operations

ROUTE CLEARANCE—5-MT WEAPON

approach the B zone. To avoid any delay in rescue operations, route clearance should begin as soon after H hour as possible.

e. *Routes*

- (1) The main task in route clearance will be to clear routes forward in the B zone to enable plant for heavy rescue to be moved forward and to shorten the carry for litter bearers from place of rescue to roadhead.
- (2) Planning for route clearance should be based on clearing one main route per sector, with circular feeder routes and, if possible, access routes to major rescue sites. As a guide the route clearance plan should be such that the maximum distance any rescue party would have to carry a casualty would not exceed one mile. A diagrammatic illustration of a route clearance plan is shown at plate 16.

f. *Provision of Plant*

- (1) The equipment needed for route clearance and rescue is far beyond military resources. The first step will be a survey of all engineer plant and operators, in conjunction with appropriate civilian engineer authorities, within approximately 100 miles of each target city.
- (2) Based on this survey plans should be made to use the plant needed in re-entry. RVs at which equipment will gather should be selected outside each target city and in surrounding towns and villages up to 100 miles away. These RVs must be known to all owners of plant and their operators.

- g. *Detailed Planning.* Planning for work must be so detailed and the arrangements for requisitioning and collection of plant should be so nearly automatic that the plan will begin to operate as soon as a strike occurs.

509. **Maps and Aerial Photographs**

- a. *General.* An adequate supply of maps and air photographs (see paragraph 810) will be on issue down to all units designated to take part in re-entry operations. Aerial photo mosaics are an essential supplement to the large scale map as they provide an accurate picture of the ground in a form easily recognized. Furthermore, they can be produced more quickly and thus be kept up to date more easily. The rapid growth of urban development quickly renders maps and town plans obsolete.

b. *Maps*

- (1) *Civilian Road Maps*—are needed for long distance movement of survival columns or other elements of the survival group.

- (2) *1:250,000*—will be available down to survival columns for approach to the target area and general communications.
- (3) *1:50,000 and 1:25,000*—will be available down to and including rescue platoons and equivalent for:
 - (a) Reconnaissance and detailed radiac plotting.
 - (b) Detailed deployment of rescue units in re-entry operations.
 - (c) Evacuation planning.
 - (d) Detailed plotting of the situation and the activities of rescue units.
- c. *City and Town Plans*—issued down to rescue company level would provide a most useful adjunct to 1:25,000 maps. These will be either special military town plans or civilian town plans overprinted with the normal military grid.
- d. *Aerial Photographs*
 - (1) *Mosaics*—are the most accurate and up-to-date substitute for maps. They will be provided down to mobile survival group headquarters and will be amended annually from new photographs. Mosaics will provide an up-to-date, graphical representation of the target area and will assist:
 - (a) In the selection of re-entry routes, traffic control posts and evacuation routes within the target area.
 - (b) In the location of obstacles and potential obstacles.
 - (c) In pre-attack damage prediction and post-attack damage assessment.
 - (d) In pre-attack briefing and the preparation of detailed plans.
 - (2) *Obliques*—taken along possible re-entry routes and natural obstacles will:
 - (a) Permit detailed assessment of re-entry routes.
 - (b) Facilitate detailed analysis of obstacles or potential obstacles.
 - (c) Permit damage assessment prediction.
 - (d) Assist pre-attack briefing and planning.
 - (3) *Stereo-pairs and Single Prints*
 - (a) Stereo-pairs, pre-strike and post-strike, are required for detailed damage assessment following a nuclear strike. If available in time, post-strike prints would be particularly useful

in assessing and plotting obstacles in advance of reconnaissance elements and along re-entry routes. This type of interpretation will not normally be done below sector headquarters.

- (b) Single prints have a variety of uses and may be issued down to platoon or section level in lieu of maps. They may be either vertical or oblique. Immediate post-strike prints would be particularly valuable but would depend on light aircraft equipped with land polaroid cameras. Such photography would be in limited supply and would need to be employed on carefully selected targets.

510. Municipal Services

- a. Re-entry forces must not rely upon electricity, gas and other services during re-entry operations. In the initial stages of re-entry these services, if damaged, may be a hazard to rescue units.
- b. The re-entry force for each target area must know municipal emergency plans and must make full use of the staffs of municipal services. Likewise the army re-entry plan must be fully known to these staffs who must know in advance what assistance they may be able to give.
- c. Plans must be made to carry out specific emergency measures in case civilian plant staffs are unable to do so. These include, where necessary:
 - (1) Shutting off electricity, gas and water supplies.
 - (2) Stopping flow of toxic wastes.
- d. Instructions have been issued by the federal government on self-help by individual citizens. Pre-strike instructions and fire prevention measures, and post-strike action in turning off water, electricity and gas at building connections, would greatly assist re-entry operations.

511. Plan for Re-entry

- a. Each target area headquarters must have a detailed plan for re-entry into the target area for not only the most likely conditions but for variations in weapon yield and ground zero, and for other conditions which the monitoring system and the predictions of the forecasters may reveal. These conditions, and the variations in the plan to cope with them, must be so clearly defined as to rule out any possibility of misunderstanding. Plans must provide for:
 - (1) Reconnaissance of routes for levels of radiation and physical conditions.
 - (2) Control and movement of people and traffic.

- (3) Rescue and provision of first aid to the trapped and injured.
- (4) Evacuation out of the damaged area, sorting, and initial care of the injured.
- (5) Clearance of routes when necessary.
- (6) Direction of police and fire services in those areas.
- (7) Direction of municipal and other services for the maintenance and repair of such utilities as water, sewage, etc.
- (8) Close co-operation with welfare services responsible for evacuation of survivors.
- (9) Residents of lightly damaged dwellings will be encouraged to remain unless radiation hazard forces evacuation.

SECTION 3—CONDUCT OF RE-ENTRY

512. Possible Sequence of Events

- a. The National Survival Attack Warning System will sound the sirens indicating an ALERT. This warns the entire population to listen to their radios. On the TAKE COVER all will go to ground in whatever shelter they have.
- b. The Nuclear Detonation and Fallout Reporting System will report the location of the burst. This will be broadcast over the radio along with prediction of fallout.
- c. The target area commander will begin immediate post-attack air and ground reconnaissance so that he can adjust or confirm the re-entry plan.
- d. Personnel of the traffic control organization will proceed automatically to pre-selected traffic control posts.
- e. Survival column reconnaissance elements and rescue companies, or even platoons, as they become operational, will proceed independently on their allotted routes towards the damaged area and commence rescue.
- f. Remaining elements of survival groups will converge as rapidly as possible along predesignated routes in accordance with the re-entry plan.
- g. Target area headquarters will issue any adjustments to the re-entry plan and, if necessary, will re-direct units to locations where they are most required.
- h. As the build-up of units takes place the various levels of headquarters will assume control until eventually operations will be under the comprehensive direction of target area headquarters.

513. **Reconnaissance**

- a. *Aerial Reconnaissance* The target area commander will need to determine the exact location of ground zero, the areas of major damage, the state of routes and the fire situation while re-entry units are approaching the damaged area. He can then make adjustments to the re-entry plan in time to alter deployment. The speed with which this information is needed, the size of the area to be covered, radiation hazards and the blockage of routes indicate that initial reconnaissance must be done by air, preferably by helicopter.
- b. *Ground Reconnaissance*
 - (1) Reconnaissance detachments of the target area reconnaissance troop would have been in position on the periphery of their allotted sectors and immediately following the strike would begin reconnaissance inward. They would conduct reconnaissance tasks generally in the priority listed below:
 - (a) Preliminary reconnaissance to:
 - i. Establish the initial radiation pattern.
 - ii. Determine the RUBBLE LINE and accessibility of routes.
 - iii. Report fire and damage pattern.
 - (b) Close reconnaissance of routes.
 - (c) Continuous survey of radiation intensity lines and reporting of fallout.
 - (d) Report nature, numbers and location of casualties.
 - (e) Report damage.
 - (f) Maintain liaison.
 - (2) The results of preliminary ground reconnaissance will provide the target area commander with the additional information needed to make his final re-entry plan.

514. **The Mobile Survival Group**

- a. *General*
 - (1) The mobile survival group is the basic organization for the conduct of rescue operations. The more promptly casualties can be rescued and evacuated the greater will be the saving of life. A rapid procedure for reconnaissance and deployment is vital. The basis of this procedure is detailed planning based on a sound appreciation of the probable situation which will be encountered in the target area.

- (2) The problem faced by the mobile survival group commander in deploying his formation and controlling its operations will depend on the extent of radioactive contamination in the target area. If contamination is heavy, and this is the more likely case, it will have to be assessed and a system of control established over radiation exposure. In the absence of significant radioactive contamination, deployment and control are greatly simplified.

b. Operations in a Heavily Contaminated Area

- (1) The procedure for rescue operations in a heavily contaminated area involves the specification of a casual dose (the dose previously acquired before re-entry and the estimated dose during withdrawal) which can be accepted for all personnel, and is additional to that received in the course of operations in high intensity areas. In principle the casual dose should be kept as low as possible and should not exceed 10r for rescue personnel and 25r for reconnaissance personnel. In practice it may be necessary to accept a higher dose. The higher the casual dose, the lower the exposure which may be accepted in operations since the total dose should not exceed 100r in one day. The casual dose may be specified by target area headquarters. Alternatively it will be determined by the survival group commander. It must be known by all officers.
- (2) A GREEN and a RED LINE will be established by target area headquarters reconnaissance detachments. These lines will follow distinguishable ground features based on the 1r/hr and 10r/hr ISORADS respectively. The area between the GREEN LINE and the RED LINE will be defined as the moderate risk area and the area beyond the RED LINE will be defined as the emergency risk area. Plate 17 shows the relative position of these lines for a 5-MT ground burst and a 15 mph effective wind.
- (3) Troops will not move forward of the GREEN LINE except to carry out rescue operations. Since radioactivity decreases with the passage of time, troops who remain behind the GREEN LINE will not receive more than 10r, however long they remain in the area. There may however be local "hot spots" behind the GREEN LINE and rear areas should be monitored as a precaution.
- (4) The significance of the RED LINE is that troops deployed forward of this line will be exposed to severe radiation hazards. In principle, troops will move forward of this line only for the purpose of

saving life, and will remain in the area for a minimum period of time contingent on their exposure level. Movement forward of the RED LINE will be on order of unit commanders and under the strict control of sub-unit commanders.

- (5) In the area between the RED and GREEN LINES the hazard will be less acute, but troops should not remain in the area any longer than necessary. Rest and re-grouping areas will be needed on the safe side of the GREEN LINE.
- (6) Before committing troops forward of the RED LINE, unit commanders will specify the maximum dose which can be accepted. This will be selected so that no man receives more than 100r including the casual dose. Officers and NCOs in charge of working parties will make constant reference to their dosimeters. As soon as the specified dosage is reached, rescue parties will be withdrawn and proceed straight back behind the GREEN LINE. Personnel and vehicles will be checked through radiation monitoring posts, and those requiring it will be contaminated.
- (7) In summary, the following drill will be employed.
 - (a) The target area reconnaissance troop will establish the GREEN LINE based upon a specific Ir/hr intensity line.
 - (b) Monitoring posts will be established on the safe side of the GREEN LINE on each survival column rescue axis. All returning vehicles and personnel will be required to pass through these monitoring posts.
 - (c) A decontamination centre will be established in the survival group sector or sub-sector well forward in the support area.
 - (d) When the survival group headquarters forms the nucleus for the sector headquarters, it will be in a static location in the periphery of the sector close to the main sector route. When there is a separate sector headquarters, the survival group headquarters will be centrally located on its rescue axis of advance and will move forward as rescue progresses.
 - (e) Troops will return behind the GREEN LINE for rest and usually for food. They may, however, be fed on the job if proper precautions are taken.
 - (f) Provost will mark subsidiary routes or man traffic posts so that all traffic rearward is routed through monitoring posts.

PLATE 17

APPROXIMATE CONTAMINATION HAZARD LINES
H + 7 Hrs—5 MT Surface Burst—15 MPH Effective Wind

WIND

7 MI

GZ
2 MI

8 MI

X

11 MI

GREEN LINE

RED LINE

0 5 10 15 20
 MILES

Notes

1. DISTANCE GZ TO X REPRESENTS THE DOWNWIND DISPLACEMENT OF THE CONTAMINATION PATTERN.
2. GREEN AND RED LINES WILL EXTEND SEVERAL HUNDRED MILES DOWNWIND BUT LINES CANNOT BE ACCURATELY ESTABLISHED UNTIL FALLOUT IS COMPLETE (UP TO 24 HOURS AFTER DETONATION).

- (g) As soon as men reach rest areas, their personal dosimeters will be read under sub-unit arrangements. The dose already received must be calculated when planning future tasks.
 - (h) The RED and GREEN LINES will move forward owing to the decay of radioactivity as time passes. The target area reconnaissance troop will re-survey and adjust these lines throughout the re-entry operation.
- (8) The mobile survival group may be deployed before fallout is complete. Even if the approach is made from the upwind side, a sudden change in upper wind conditions may result in elements of the group being caught in the fallout pattern. There is also a risk of fallout from nuclear weapons detonated over other target areas. In order to guard against this the survival group will establish a radiation control point in the vicinity of group headquarters. The radiation intensity will be measured every half hour. Any increase in intensity will be brought immediately to the attention of sector or target area headquarters for a decision on whether shelter is to be sought or a move is to be made out of the area. All elements of the survival group should have completed reconnaissance for tentative shelter areas.

c. *Relation Between RUBBLE LINE and the RED and GREEN LINES*

- (1) The RUBBLE LINE marks the limit of entry of vehicles because of the physical blocking of routes. THE RED and GREEN LINES mark the limits of entry of personnel and vehicles because of radioactive hazard.
- (2) The deployment of rescue units will usually be governed by the extent of radioactive contamination. The controlling factor, when contamination is heavy, will be the location of RED and GREEN LINES. When contamination is light, initial deployment for rescue operations will not be restricted. The RUBBLE LINE will be a controlling factor as rescue works inward and rescue operations will be greatly hindered if adequate route clearance has not been under way.

d. *Reports*

- (1) The following routine reports will be used to pass information within the mobile survival group, and to higher and flanking headquarters as required:
 - (a) Radiation monitoring report (RADREP)
 - (b) Situation report (SITREP)

- (c) Damage reconnaissance report (DAMREP)
- (d) Radiation exposure report (RADEXREP)

(2) *Radiation Monitoring Report (RADREP)*. The radiation monitoring report will include the following information:

- (a) Place of observation.
- (b) Time of observation.
- (c) Dose rate in roentgens per hour.

It will normally be passed by radio. An example of a RADREP is:

RADREP grid ref 69104371 time 1605 r 14.

(3) *Situation Report (SITREP)*. Situation reports will include (if relevant):

- (a) Location of headquarters and sub-units.
- (b) Present activity.
- (c) Total number rescued and casualties evacuated
- (d) Estimated time of completion of tasks.
- (e) Other relevant information.

SITREPS will be submitted immediately following deployment and at stated intervals thereafter.

(4) *Damage Reconnaissance Reports (DAMREP)*. Damage reports will give the extent of damage and work to be done in a given area.

(5) *Radiation Exposure Reports (RADEXREP)*. Detectors will be read as soon as practicable for all personnel working forward of the GREEN LINE and exposures will be recorded at unit headquarters.

c. *The Mobile Survival Column*

(1) *Reconnaissance*. The mobile survival column has its own reconnaissance detachment. This detachment would move independently into the target area and would commence reconnaissance of the area of responsibility designated in planning. It would receive some information from the preliminary reconnaissance carried out by the target area reconnaissance troop. It would conduct detailed reconnaissance to report on:

- (a) Radiation levels and rescue tasks throughout its own area of responsibility.
- (b) Obstacles.
- (c) Fire.
- (d) Damage.

(2) *Column Headquarters*

- (a) The mobile survival column headquarters will be established on or near the column main axis. It will establish an operations room which will be manned by an officer. The following will be maintained:
 - i. Operations log in which are recorded all orders and information concerning the conduct of operations.
 - ii. Situation map.
 - iii. Combined location and status board for all sub-units showing location, working strength, task and estimated time of completion of task.
 - iv. Radiation monitoring log.
 - v. Record of radioactive exposure.
 - vi. Total number rescued and total number of casualties evacuated
- (b) *Radiation Monitoring Posts.* A combined radiation monitoring and traffic post will be established by C Pro C on the column rescue axis where it crosses the GREEN LINE. The survival column headquarters will maintain a monitoring post at its own headquarters.
- (c) *Reconnaissance and Orders*—should be streamlined to save time. It is suggested that the normal O and R groups be combined. The progressive procedures associated with field operations are too slow and unnecessary here.
- (d) *Maintenance of Control.* Areas of responsibility should be clearly designated. In areas of light damage this can probably best be done by using streets as boundaries. Within areas of heavy damage, structures and streets may be difficult to recognize and it may be necessary to mark areas of responsibility by tapes or signs.
- (e) *De-briefing.* Officers of rescue companies should be de-briefed upon withdrawal to rest. This will consist merely of reporting areas cleared and numbers rescued at column headquarters as companies pass back to their rest area. A record should be maintained of work done and of all tasks outstanding. It must be remembered that all ranks will be under a very great stress and unless this procedure is followed important tasks will be overlooked.

f. *The Engineer Squadron*

(1) *General*

(a) The composite squadron RCE has been organized to carry out certain specific tasks during re-entry. The deployment of a squadron within a sector will be governed by the tasks allotted to it by sector HQ. As a result the Composite Squadron RCE will normally operate under central control although field engineer sections may be allotted in support of mobile survival columns as required.

(b) The main tasks of the composite squadron RCE are route clearance, water supply, and rescue which requires the use of certain skilled personnel or assistance of mechanical equipment.

(2) *Route Clearance.* The necessary plant will assemble in plant RVs operated by the plant park troop. As required plant will be sent forward to sections of the plant operating troop where it will be employed on route clearance tasks. Deployment of the sections of this troop will be in accordance with the route clearance plan prepared by Sector HQ.

(3) *Water Supply.* The potable water required by the personnel of the MSG will be provided from a sector water point. This water point will be established and operated by the water supply section. Water for other purposes, which does not require purification, eg. washing and decontamination, can be provided by fire pumps after H + 10 hrs.

(4) *Heavy Rescue*

(a) The field troop of the composite squadron RCE contains sections of skilled personnel to carry out specialized tasks and to operate equipment to assist MSCs in rescue which is beyond the capabilities of the rescue companies. The sections can also carry out the following tasks to facilitate operations of the MSCs:

- i. Cutting trees, rafters, beams, hydro poles etc, with power saws and oxy-acetylene cutting equipment.
- ii. Cutting off water, gas and hydro mains and sources of toxic waste and generally making damaged utilities safe.
- iii. Minor demolitions of damaged buildings to make rescue tasks easier and safer.
- iv. Shoring up damaged buildings.

- (b) During re-entry operations these sections may be deployed on a task basis and may carry out their work under the control of the troop HQ or they may be placed in support of mobile survival columns to assist them as required.

g. Logistics

(1) Survival Group Support Area

- (a) The survival group support area will be under the direct control of the survival group headquarters. It will normally be commanded by the 2IC of the major unit on which the group is based. It will be centrally located behind the GREEN LINE and will include:
 - i. Rest areas for rescue units.
 - ii. Central feeding areas.
 - iii. Petrol points.
 - iv. Water points.
 - v. Decontamination centre.
 - vi. Evacuee transit areas.
 - vii. Transport pool.
- (b) Diagrammatic layout of a survival group support area is shown at plate 18.

(2) The Transport Company RCASC

(a) Transport

- i. Transport platoons form a pool of transport for the sector on the basis of one for each mobile survival column. Normally platoons will be under column control only during the initial lift of column personnel to the scene of operations. They will then come under control of the transport company headquarters. In Regular Army columns, unit load-carrying vehicles, not used in carrying rescue equipment, will form transport sections and platoons and will be employed under control of the transport company.
- ii. Transport platoons should be located in peace in the same area as their associated mobile survival columns. Loading procedure and RVs should be included in re-entry plans. Requisitioned transport needed to augment platoons should be earmarked in peace.

(b) *Feeding*

- i. Central feeding centres will be established in the support area. A system of twelve-hour shifts will allow each man two hot meals a day; going on and coming off duty. Shift times will be staggered and hot food must be available on a 24-hour basis.
 - ii. Rations will be carried on the man or in section or platoon bundles.
- (c) *POL*—delivery points will be established in the survival group support area. They may be:
- i. *Civilian Service Stations*—which are functioning and under control of the civilian operator.
 - ii. *Military Service Stations*—which have been abandoned by the civilian operator and which are out of order. They will be manned by a military staff using, if necessary, hand operated pumps and hoses.
 - iii. *Petrol Points*—similar to field operations.

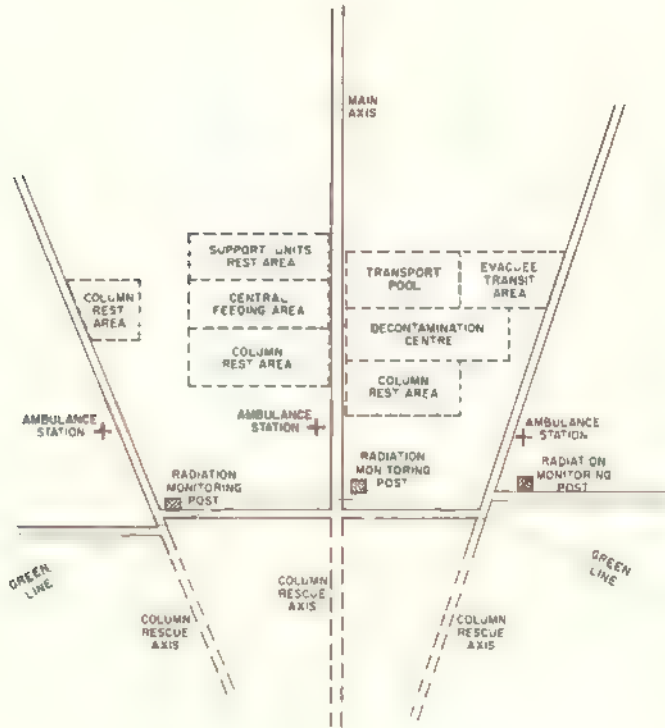
(3) *The Medical Company*

- (a) The employment of medical services is covered in detail in Chapter 7.
- (b) The medical company will establish an ambulance station on each mobile survival column main rescue axis just outside the GREEN LINE. Rescue units will carry casualties to ambulance loading points which operate as far forward as routes will permit. Casualties will be cleared from the damaged area to ambulance stations. Preliminary sorting will be done here and essential treatment will be given pending further evacuation.

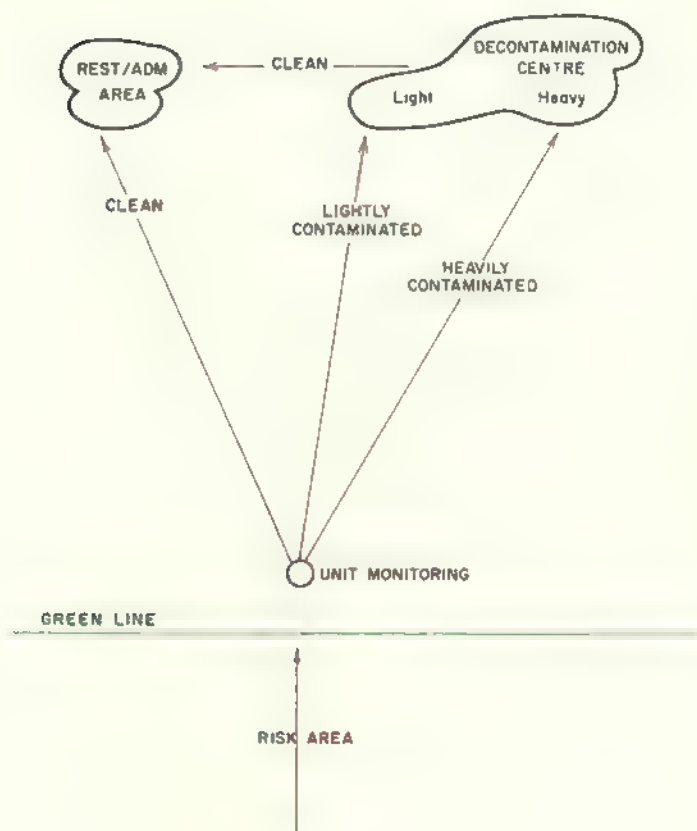
(4) *The Decontamination Company*

- (a) Decontamination centres, one for personnel and one for vehicles and equipment, will be established in the survival group support area.
- (b) The decontamination company will provide complete decontamination facilities for rescue personnel and their equipment and decontamination facilities (bathing only) for civilian survivors.

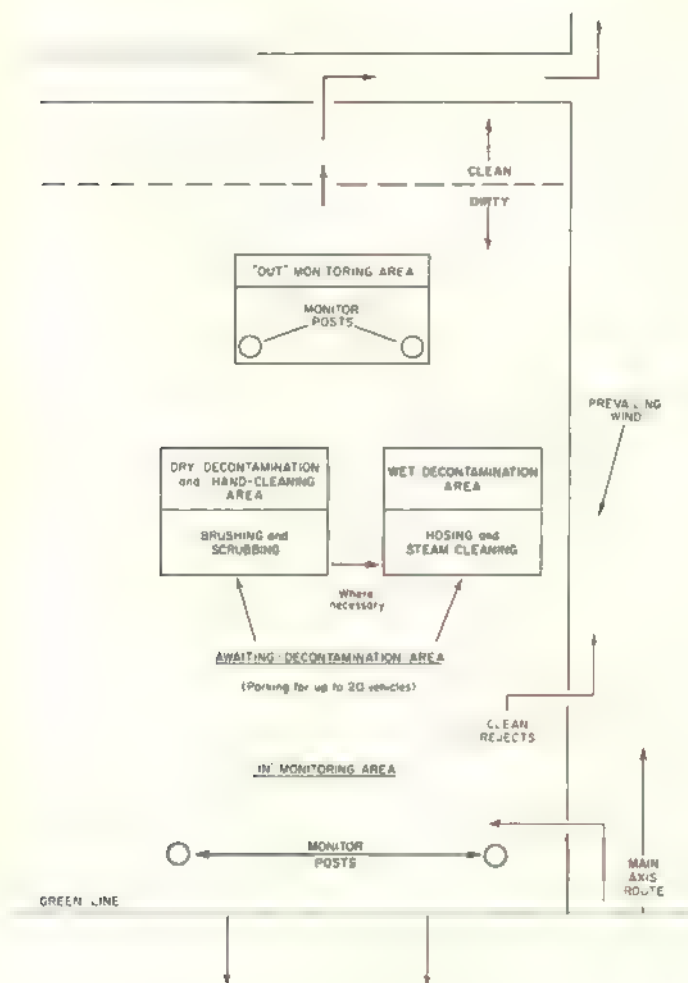
**DIAGRAMMATIC LAYOUT
SURVIVAL GROUP SUPPORT AREA**



- (c) A diagrammatic layout of a personnel decontamination centre and a vehicle and equipment decontamination centre are shown at plates 19 and 20 respectively.
- (5) *The Police Platoon*—will man traffic posts throughout the sector under control of sector headquarters. It will sign routes, man traffic posts and ensure free movement of traffic in accordance with the movement plan.
- (6) *The Recovery Platoon*
 - (a) The recovery platoon will provide limited route clearance on a priority established by sector headquarters. It will also provide limited heavy lift to assist engineers, if required. Recovery sections have the capacity to work on a 24-hour basis.
 - (b) The headquarters section will calibrate radiac equipment and will provide limited technical advice to the decontamination company concerning equipment decontamination.
- (7) *Water*
 - (a) Water points will be established in the survival group support area by water sections of the composite engineer squadron.
 - (b) If a potable water supply cannot be provided within the sector, the transport company will lift water in water trailers to the support area.

PERSONNEL DECONTAMINATION CENTRE

VEHICLE AND EQUIPMENT DECONTAMINATION CENTRE



CHAPTER 6

OPERATIONS IN A FALLOUT AREA (PROVISIONAL)

SECTION 1—INTRODUCTION

601. GENERAL

- a. In addition to re-entry operations into a damaged area, the Army is responsible for the direction and control of operations in areas which have not suffered blast and thermal damage but which have been contaminated by heavy fallout.
- b. In the event of a nuclear attack on Canada or the northern section of the United States, heavy fallout might cover large portions of the inhabited parts of Canada and could be of great danger to a large number of Canadians in a nuclear war.
- c. Despite the seriousness of the threat, a well-co-ordinated plan based on the best use of available shelter or refuge, and on the observance by the public of regulations restricting their activity during the first few days and weeks following the attack, would have a highly significant effect in reducing the number of casualties.
- d. Studies are being conducted on the many factors which have a bearing on the problem of fallout protection following a nuclear attack and until these studies are completed it will not be possible to formulate a definitive long-range plan. An interim plan has been drawn up, however, to fill this gap and this chapter outlines this plan which will serve as a guide for preliminary planning by Army commanders.

602. Object and Scope of Interim Plan

- a. The object of the interim plan is to provide the means of keeping the public in fallout areas continuously informed, advised, and controlled in order to reduce, in so far as practicable, the amount of radiation exposure they would receive.
- b. The people in heavy fallout areas would be urged to stay in their houses to the greatest possible extent, except for limited numbers who might be moved, under direction, from frame houses with a low protection factor to pre-designated buildings providing a higher protection factor.
- c. The fallout area would be divided into a number of zones, defined in terms of the level of radioactivity in

each, and each having a prescribed set of regulations for the persons in it. These restrictions would range from complete release in 48 hours or less in the zone of lowest radioactivity to the complete evacuation of the zone of highest radioactive contamination.

603. **Limitations of the Plan**

- a. Because of the magnitude of the problem it is recognized that any plan will have limitations. Four of the most important limitations of the interim plan are:

- (1) *It does not guarantee a full measure of protection from the immediate dangers of fallout for everyone in the fallout area.* The plan is based on the assumption that all persons would be able to obtain in refuge a protection factor of 10 (protection factor is the factor by which the outside radiation dose has to be divided to get the inside dose) and time spent in places with this protection factor is referred to subsequently in this chapter as "in refuge". Some people would find better protection, the basement corner of a two-storey brick house would provide protection in the order of 25 while specially constructed household fallout shelters would have a protection factor of perhaps 80 to 100. Others, for a variety of reasons, might not have the benefit of protection as high as 10. The situation could be considerably improved by assessing during the planning stage all buildings and natural shelters in the area which provide a high protection factor and to which persons could be directed immediately after an attack. Variations in the degree of protection, however, must be accepted and do not invalidate the approach adopted for the interim plan.
- (2) *It does not eliminate the long-term consequence of radiation.* The interim plan is designed to safeguard a large portion of the public against the immediate dangers of fallout. It concentrates therefore on the elimination or significant reduction of the incidence of radiation sickness. The long-term consequences of exposure to gamma radiation are recognized. It is not feasible, however, to evolve a plan which would eliminate these consequences. At the same time it should be stressed that if the incidence of radiation sickness is kept to a minimum, the incidence of the long-term effects will also be restricted.
- (3) *The application of the plan would be considerably affected by the period of time over which an attack extended.* The interim plan as outlined in this chapter is designed primarily for the situation which would arise if one or more strikes are made on a target area within the space of a few minutes.

A more prolonged attack would make the problem considerably more complex and would necessitate major changes in the application of the plan.

- (4) *No attempt is made to deal with contamination of growing crops and other agricultural and food hazards, nor with problems relating to the continued operation of public utilities.* These problems are being studied by appropriate scientific agencies and recommended measures and procedures to deal with them will be included in the long-range civilian plan.

SECTION 2—PLANNING AND CONDUCT

604. Basic Considerations

- a. *Minimizing Radiation Sickness.* The principle of keeping radiation sickness to a minimum is fundamental to the plan. The average house can be made to give a useful degree of protection (see Plate 21) and it would be a question of using this protection to the best possible advantage. Theoretically, and provided that adequate provision had been made for food and water, the longer people could avoid coming into the open the better. Practical considerations make it obvious, however, that a plan which attempted to impose restrictions more severe than people thought were necessary in their own interests would have little chance of success. Moreover, there would be an urgent need to release people in areas flanking the main fallout areas so that communities could mobilize their resources to assist the more seriously affected areas.
- b. *Time for Initiation of Plan.* Because decay rate is rapid in the first hours after an explosion, it is highly desirable, for planning purposes, to select an approximate datum time which would take advantage of this characteristic and still be a practicable time at which to end the period of no outdoor activity and mark the beginning of the period of restricted activity or, if applicable, remedial evacuation. This datum time has been established as $H + 48$ hours and general plans should be based on a controlled resumption of activity in a large part of the fallout area at that time. There would be no movement prior to this, except for the limited local movement that would take place in areas where fallout was not expected for an hour or more (eg, movement of people, by direction of civilian authorities, to nearby buildings providing a higher protection factor). The precise timing would be a matter for decision at the time, based on actual readings, and would be affected by the general pattern of the attack. For this reason, the impression should not be created that action would begin at exactly 48 hours. Rather, the public should be advised to be prepared to

stay in refuge until they are told it is safe to come out, which would probably be at the end of two or three days.

- c. *Self Help.* Great emphasis must be placed on self-help and it must be recognized that under fallout conditions the household becomes the basic unit. A well-informed public would be a prerequisite for the success of the plan and to this end the public is being urged to read and follow the advice contained in the EMO booklet "Eleven Steps to Survival".
- d. *Protection Factor.* The assumption that most people would have a protection factor of 10 against radioactivity is critically important for the classification of the fallout areas into zones, which is the basis of the interim plan. The restrictions and regulations for each zone have been based on the average cumulative doses acceptable under the circumstances, having regard to the aim of keeping the cases of radiation sickness to a minimum.
- e. *Communications.* If the interim plan is to be effective, all occupants in every building must be reached. The emergency broadcast network would be the most effective medium but it would be necessary to supplement it with other means. Except in the area close to the detonation, the telephone system might still be in operation, although planning should not be based on this assumption as the overloading of the system could make it inoperative. Loud-hailers mounted in helicopters might provide a means of passing information to people in refuge and they would undoubtedly be useful in controlling traffic in remedial evacuation.
- f. *Evacuation.* Movement out of the area based on fallout prediction would not normally be feasible or desirable because of the uncertainty of the predicted pattern. Nuclear detonations might occur at varying times over widespread areas, resulting in a complex fallout pattern. People might be moved from one predicted fallout area, which did not materialize, into an area which later became heavily contaminated. On the other hand, remedial evacuation, after fallout is complete, from zones of unacceptably high intensity to safe reception areas is an essential part of the plan.
- g. *Available Resources.* The Army's tasks would be mainly concerned with the prediction and confirmation of the fallout zones (in conjunction with civilian monitoring agencies) and with the general direction of the interim plan. Fallout areas would be so large that it would not be feasible for the available troops to mark off boundaries and control movement in detail. The only practicable method would be to make full use of existing municipal and provincial organizations. Police and other services should be largely intact and they would have the com-

munications and knowledge of local conditions to control and guide the public within areas of restricted movement and to evacuate areas where evacuation would be necessary.

- h. *Command and Control.* It would be the Army's responsibility to prepare, in conjunction with the appropriate civilian authorities, the outline plan for operations in fallout areas and to direct these operations through the police and other appropriate agencies. If its city had not been attacked, the target area headquarters would control these operations for its own city and might also control operations downwind of the city if it is the closest headquarters. When it would not be feasible to use a target area headquarters, a static army headquarters would perform this task. In either case it would be necessary to organize small control headquarters which would move to the flanks of the fallout area to co-ordinate operations within the zones.

605. **Fallout Pattern**

- a. In a surface burst the extent and nature of the fallout can range between wide extremes, and is influenced by a combination of factors. Some of these are:
 - (1) Yield and design of the weapon;
 - (2) The height of burst;
 - (3) The meteorological conditions;
 - (4) Nature of the terrain.
- b. The total amount of radioactivity in the fallout area depends on the extent to which the fireball touches the ground and it increases as the height of burst approaches zero and more of the fireball comes into contact with the earth.
- c. Meteorological conditions influence the size, shape, and location of the fallout pattern on the ground. The wind structure between the ground and the cloud is the most important factor. The cloud from a megaton weapon reaches heights of 80,000 to 120,000 feet. At such heights, air currents flow over North America mainly from west to east, and meteorologists on a particular day can forecast what direction the cloud will follow. In very general terms, the areas subject to contamination by fallout are more likely to be east of our target cities.
- d. As a general rule, the fallout area would form an irregular pattern of contamination. This is called the downwind pattern. The borders of the area would not, of course, be clearly delineated but diffused, and the dust would be distributed in a patchy fashion. This is emphasized to dispel false concepts which might arise from an examination of a conventional fallout diagram

on a map. Radiation fallout can be compared to the dust from an ordinary dust storm or to the snow from a blizzard to see that greater or lesser amounts will accumulate here or there and that nicety in fallout prediction cannot reflect the true state of affairs on the ground. Only measurement by instrument can accurately determine the safety or otherwise of any given location in a fallout field.

- e. The fallout reporting posts of the NDFRS would provide the basic information needed. They would not, however, detect "hot spots" where radiation intensity could be much higher than the general level, nor would they define the edge of the fallout area. This detailed monitoring is essential and must be a responsibility of civilian agencies.

606. Control Zones

- a. The basis for the interim plan is the division of fallout areas into zones of radiation intensity, for each of which a drill to be observed by the public can be prescribed.
- b. The letters W, X, Y and Z would be used to identify four kinds of zones. The zone category would be determined by the dose rate in roentgens per hour at approximately 48 hours after burst (ie, as a general rule 1/100th of the rate at one hour after burst). This is based on the following factors:
 - (1) Fallout would not have travelled far in the first hour and the dose rate at this time would therefore be a theoretical concept only for most of the area.
 - (2) Generally, except in zone W, no activity outdoors would be required or encouraged within the first 48 hours, except for the limited local movement mentioned in sub-para c below.
 - (3) There would be obvious advantages in basing action in the fallout areas on a predicted dose rate at 48 hrs which could be verified from instrument readings at the time. This would provide a safeguard against any variation in the decay rate and would be a check on predictions made at $H + 7$.
- c. It is emphasized that fallout may not arrive in outer areas until several hours after the burst. The period between the time of burst and the arrival of fallout would therefore be a bonus and would permit such urgent tasks as increasing the protective factor of houses to be carried out.
- d. Plate 22 gives a summary of the zones and the recommended action in each.

607. **Zone W**a. *Characteristics*

- (1) Zone W would cover the fringes of the fallout area. Its outer boundary would initially be the limits of those districts for which a warning message has been issued signifying imminent danger of fallout.
- (2) Its inner boundary would form the outer boundary of Zone X.
- (3) During the first 48 hours Zone W would contract as the dose rate fell below 0.1 r/h. After 48 hours the Zone would cease to exist for public control purposes.

b. *Retrictions*

- (1) The proposals for Zone W are designed to ensure that no one would get a short-term dose of more than 10r even if he spent the whole of the next 12 hours in the open after being released.
- (2) Provided that the people in this zone observed the suggested restrictions for the first two or three days, they would be able, without restraint, to play their full part in the work of restoration, decontamination and recuperation. The aim would be to release them progressively at the earliest moment it would be safe to do so.

c. *Establishing Outer Boundary*

- (1) The first step would be to establish an outer boundary and to warn the public of the fallout danger by erecting notices starting with the main roads or streets.
- (2) It would not likely be feasible to establish road blocks or attempt to do anything more than inform the public of the hazard and advise them of the prescribed restrictions.

608. **Zone X**a. *Characteristics*

- (1) Zone X would be a zone of comparatively light contamination. Its extent could be considerable, however, perhaps 600 miles long and 70 miles wide for a 5-megaton weapon.
- (2) Once two or three hours had elapsed after the burst, something closely approximating normal working conditions would have to be restored. The dose rate in the area, which would have ranged from 10 r/hr up to 100 r/hr at one hour after burst, would have fallen to between 0.1 r/hr and 1.0 r/hr at H plus 2 days.

b. *Restrictions*

- (1) The dose received by people in the area at the end of 48 hours, assuming they had spent this time in refuge, would be between 3r and 30r. For the remainder of the first week (ie, the next five days) they should not spend more than four hours per day in the open, but this would enable most people to go about their normal business. For the remaining 20 hours of each day, they would be advised to spend as much time as possible in their refuge but in any case indoors.
- (2) At the end of the first week the zone would return to normal, except that all persons in it would be advised to be outdoors as little as possible and not, in any case, more than 8 hours per day in the open for the next three months. In addition, they would be advised to sleep in their refuge, as opposed to merely being under cover in their homes.

c. *Establishing Boundaries*

- (1) The outer and inner boundary of Zone X would be determined using information provided by the NDFRS and civilian radiological defence monitoring agencies.
- (2) The roads crossing the inner boundary (which would also be the outer boundary of Zone Y) would be marked after a lapse of 48 hours to show the fallout danger within the zone. Warning signs would be more mandatory in character than the warning signs for Zone W and would prohibit the entry of all persons into the area.
- (3) Persons wishing to leave the zone and having the means to do so would not be prevented from moving but would be warned of the intense overcrowding of accommodation likely to be found elsewhere and of the danger of being unable to find adequate shelter in the event of another attack.

609. **Zone Y**

a. *Characteristics*

- (1) Stringent precautions would be essential in Zone Y as $H + 1$ dose rates in the open might be as high as 250 r/hr. Though much smaller than Zone X, it would still cover a large area. A 5-megaton weapon might give rise to a Zone Y up to 25 miles wide and over 300 miles long.
- (2) Even at 48 hours the dose rate in the open would range between 1.0 r/hr and 2.5 r/hr and the inhabitants of the zone who, if in refuge, would

have received a dose of between 30r and 70r, would, if they were not to become sick, have to act with discipline and discretion.

b. Restrictions

- (1) After the first 48-hour period persons in this area would need to restrict the time spent outdoors to two hours per day at the most, and the time spent out of their refuge, but under cover, to a further eight hours per day.
- (2) Even after 14 days they would need to remain under cover as far as possible and should not in any event be in the open for more than four hours per day for the next three weeks.
- (3) After the first two or three days Zone Y would begin to function again although there would probably be some sickness among the occupants of the zone.
- (4) It would be important to use the permissible two hours in the open to the best advantage and careful organization would be essential to avoid more people emerging at the same time, for example, to get food, than could be attended to promptly.
- (5) Only the most urgent of outdoor tasks could be performed by people already in the zone, but key personnel needed for the operation of essential services would be able to report for duty, provided protection was available for them at their places of work.
- (6) People would be discouraged from leaving the zone.

610. Zone Z

a. Characteristics

- (1) The dose rate in this zone would be at least 250 r/hr at $H + 1$ and at 48 hours it would still be 2.5 r/hr in the open at the outer contour. If people in the zone had the benefit of a protection factor of 10 in their refuges, their minimum cumulative dose would be about 85r, and much higher doses would be received in parts of the zone.
- (2) On its outer fringes, the zone would contain people who would have a good chance of escaping any serious effects. Further in towards the fallout axis and closer to GZ, sickness would be general with symptoms beginning to appear after about 48 hours. In the inner part of the zone, lethal doses of radiation would be received by some, and the entire population would be suffering various degrees of incapacity. The chances of ultimate survival of many of these might be slender.

- (3) Zone Z might cover an area of over 1,000 square miles. It is emphasized that this figure, like other zone dimensions given in this chapter, provides no more than a rough estimate of the scale on which control operations might have to be conducted.

b. *Evacuation*

- (1) Since it would be impossible to organize normal or even restricted communal life in this zone, complete evacuation would have to be carried out. After 48 hours radioactivity would continue to decay, but at a relatively slower rate and since people could not remain indefinitely in the zone, they should be removed as soon as possible after 48 hours. Evacuation before this time would probably increase the cumulative dosage of the persons being evacuated due to the high intensity to which they would be exposed during evacuation.
- (2) The clearance of Zone Z would be an operation requiring the closest co-operation between the Army and the provincial and municipal authorities. It would be the Army's responsibility to provide the general direction for the evacuation which would, however, be planned in detail with the civilian authorities and implemented, for the most part, by the police and other appropriate civilian agencies.
- (3) As a general principle no one should be sent into the zone until approximately 48 hours had elapsed. The interval would be used, however, for making preparations to bring all available resources to bear as soon as action became possible. These preparations would include:
 - (a) Broadcast instructions designed to sustain morale and to prepare people in Zone Z to co-operate in their own relief and, in particular, to inform those who had their own means of transport when to move and in what direction;
 - (b) Preparation of reception areas in Zone W and beyond;
 - (c) Preparation of the movement plan and marshalling of any additional transport required.

611. *Conclusion*

- a. Fallout, because of its characteristics, could be the greatest potential danger and would undoubtedly be difficult to combat. It must be stressed, however, that relatively simple protective measures by a well-informed public, acting within the framework of a co-ordinated plan, would greatly reduce the number of casualties.

- b. As the many problems relating to the protection of the public in an area of heavy fallout are given further study, the interim plan will be superseded by a more comprehensive long-range plan. Included in the problem areas still under study are the exact division of responsibility between the Army and civilian authorities for the detailed implementation of the plan; the detailed organization for civilian radiological defence and its method of operation; and the detailed methods to be used to keep the public fully informed during the period of fallout. Until these problems are resolved, detailed planning cannot be completed at the lower echelons of command. Preliminary planning at higher headquarters can begin, however, and the principles and general procedures outlined in this chapter will serve as a guide for this planning.

**BUILDING PROTECTION FACTORS
(ESTIMATED)**

STRUCTURAL TYPE	Protection Factors		
	Frame (Wood Siding)	Frame (Brick Veneer)	8" Brick
<i>Central Mortgage & Housing</i>			
<i>3 Bedroom Houses</i>			
2 Storey:			
Ground floor centre.....	2	3+	7
Basement centre.....	10	16	23
Basement corner.....	15	25	41
1½ Storey:			
Ground floor centre.....	2	3+	8
Basement centre.....	8	12	17
Basement corner.....	15	20	26
1 Storey:			
Ground floor centre.....	2—	3—	5
Basement centre.....	7	8	9
Basement corner.....	11	12	13
3 Storey apt. block (6 units)			
Ground floor centre.....	2	3.5	8
Basement centre.....	13	16	23
Basement corner.....	25	31	49
Multistorey reinforced concrete			
lower floors.....	10 (away from windows)		
basement (entirely below grade)	1000 or more		
Shelter below grade..... (3 ft of earth cover)	1000 or more		

NOTES: (1) The values given are for guidance only. For example those for basements may in fact be twice as high as those given.

(2) This plate is taken from the Nuclear Weapons Section of the Emergency Health Services Manual.

SUMMARY—FALLOUT CONTROL ZONES **PLATE 22**

Zone	Definition of Zone Boundaries	Range of Cumulative Doses in Open at 48 Hrs	Recommended Action	Range of Cumulative Doses if Control Rules Observed
W	Outer: Limit of area warned that fallout danger is imminent	Maximum of 30r	Complete release from refuge as soon as dose rate fell to 0.1 r/hr or, if the rate had not reached that figure, when fallout was complete.	At 48 hrs: Below 3r
	Inner: 0.1 r/hr at 48 hrs			
X	Outer: 0.1 r/hr at 48 hrs	30—330r	Qualified release from refuge after 48 hrs—indoor workers to follow normal occupations, but not to exceed 4 hrs per day in the open. Outdoor workers to work half shifts for next 5 days. At the end of this period the zone would be normal, except that all would be advised to be outdoors as little as possible and not in any case, more than 8 hrs per day in the open for the next three months.	At 48 hrs: 3 — 30r
	Inner: 1.0 r/hr at 48 hrs			At 7 days: 10 — 100r
Y	Outer: 1.0 r/hr at 48 hrs	330—850r	Release from refuge under stringent control after 48 hrs. For the next 12 days, time in the open should not exceed 2 hrs per day, time under cover a further 8 hrs, with the remaining time in refuge. On this basis essential workers should be able to get to their work but outdoor work would remain suspended. A relaxation would be possible after the next two weeks and further easement in another three weeks.	At 48 hrs: 30 — 85r
	Inner: 2.5 r/hr at 48 hrs			At 14 days: 80 — 220r

Zone	Definition of Zone Boundaries	Range of Cumulative Doses in Open at 48 Hrs	Recommended Action	Range of Cumulative Doses if Control Rules Observed
Z	2.5 r hr at 48 hrs	Above 850r	<p>All movement outside refuge accommodation in the zone would be dangerous. People should remain in refuge until instructions for evacuation were given.</p> <p>The evacuation would probably begin about 48 hours after the attack and removal from the zone would be for at least 3 months.</p>	At 48 hrs: above 85r

NOTES: (1) After 48 hrs Zone W would for public control purposes have disappeared: its outer boundary would have moved during the period to coincide with the outer boundary of Zone X.

(2) The cumulative dose is based on exposure beginning at $H + \frac{1}{2}$ hr.

(3) Protection factors are assumed to be as follows:

Refuge 10:1
Indoors 2:1

CHAPTER 7

MANAGEMENT OF MASS CASUALTIES

SECTION 1—INTRODUCTION

701. General

- a. The term "management of mass casualties" denotes the principles, procedures and techniques which have been evolved to meet the large numbers of casualties that would be created simultaneously in the event of a nuclear attack.
- b. While the handling of large numbers of casualties is not a new problem, the creation of thousands of casualties by a nuclear strike would present a medical problem far more extensive than any previously known. Deployment of medical resources must be planned in comprehensive detail and must be based on a realistic appraisal of the immensity of the task.

702. Basic Concepts

- a. The following concepts have been formulated for the handling of mass casualties:
 - (1) All available military and civilian medical and para-medical resources must be fully utilized. These resources would include the RCDC which, in addition to its normal role, has been assigned a role in support of the CFMS to assist in the management of mass casualties.
 - (2) Medically trained personnel must be used according to their highest skill in providing emergency medical care. Medical services will therefore have urgent need for manpower to perform non-specialist tasks.
 - (3) The medical plan must be based on the principle of doing the greatest good for the greatest numbers.
 - (4) Continuity and standardization of treatment are important factors. Thus treatment at each stage of evacuation must continue and develop treatment previously given. Adequate documentation is essential to ensure that remedial or sustaining treatment once begun is carried to its proper conclusion.
 - (5) Early treatment is essential. The longer medical care is delayed, the less chance a patient has of recovery.
 - (6) Skilled professional personnel, with essential diagnostic and therapeutic equipment, should be

brought as close to areas having casualties as circumstances will permit.

- (7) Sorting is the key to doing the greatest good for the greatest number. The process of quickly sorting the sick and wounded on the basis of urgency is of paramount importance.
- (8) Evacuation must be efficient and rapid. Unless forward medical installations are cleared quickly they become saturated and less effective.
- (9) Communications between casualty handling installations are essential for an efficient and orderly movement of casualties and supplies between facilities.
- (10) Medical and surgical supplies and equipment must be available immediately and large reserve stocks must be available for movement into the damaged areas.

SECTION 2—RESPONSIBILITY

703. General

- a. A task specifically assigned to the Army by the Civil Defence Order is "the rescue and provision of first aid to those trapped and injured". In addition to this task, The Canadian Forces Medical Service (CFMS) will sort patients and provide initial sustaining medical care at field medical units supporting the survival columns. This responsibility will be in addition to the basic CFMS function of providing medical care for the armed forces and its responsibility for emergency health and sanitation measures in the area of re-entry operations.
- b. The main responsibility, however, for the management of civilian casualties in the post-attack period rests with the provincial and municipal health authorities, with assistance from the Department of National Health and Welfare. Although the CFMS will control the sorting, treatment and evacuation of casualties in the area of re-entry operations, it will require assistance and support from civilian emergency health services.
- c. In order that the civilian emergency health services and the CFMS may make the maximum use of medical and health resources, their planning must be closely and continually co-ordinated at federal and provincial level. Similarly, planning by municipal health authorities and the target area headquarters must be closely co-ordinated.

SECTION 3—PATTERN OF THE MEDICAL PLAN

704. General

- a. A clear-cut delineation of responsibility between the CFMS and civilian medical agencies is difficult because it will vary in different areas, depending on the medical

resources available. A system of echelons of medical care has been devised which divides the responsibility, at least in part, between military and civilian services. These echelons are:

- (1) *First Echelon*—first aid by rescue workers.
 - (2) *Second Echelon*—sorting and sustaining care by supporting CFMS (or emergency health service) units.
 - (3) *Third Echelon*—emergency care by improvised emergency health service hospitals or medical centres.
 - (4) *Fourth Echelon*—definitive care in civilian hospitals.
- b. The echelons of medical care and the chain of evacuation are shown schematically in Plate 23.

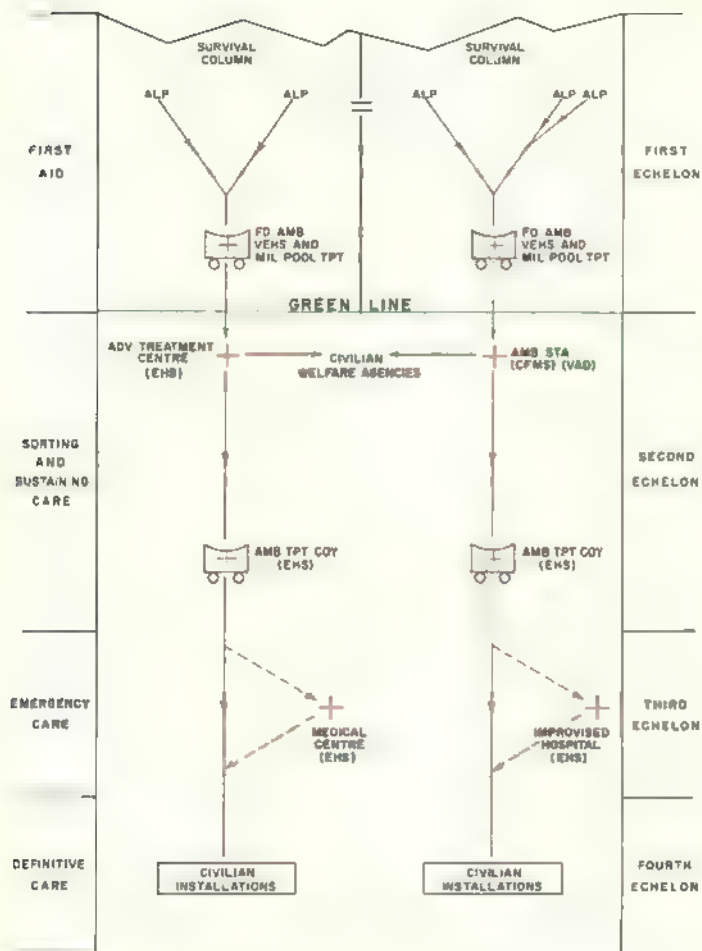
SECTION 4—FIRST ECHELON CARE

705. **First Aid by Survivors**

- a. Treatment of an injured person may begin with self-aid or assistance by survivors in the immediate area.
- b. Survivors in the damaged area might include members of the armed forces. They, together with surviving members of the warden service would be available to organize and direct neighbourhood first aid efforts until the arrival of the survival columns.
- c. The re-entry plan for the area will provide for the earliest possible arrival of key members from the closest survival column who will take charge of voluntary and spontaneous first aid (and rescue) activities of volunteer workers.

706. **First Aid by Rescuers**

- a. Rescue companies and platoons of survival columns will arrive in the damaged area as soon as possible after the nuclear strike. All military members of the rescue forces and a varying percentage of the civilians in the cadre columns will be trained in first aid.
- b. Casualties with very minor injuries will be given first aid locally and despatched as evacuees.
- c. Casualties with more serious injuries but capable of walking will be directed to the closest ambulance loading point (see para 707) for evacuation.
- d. Litter bearers will carry litter cases to the ambulance loading point. In order to make full use of the military rescue workers, who are qualified in first aid, volunteers and civilian rescue workers not so trained should be used as litter bearers as much as possible.

ECHELONS OF MEDICAL CARE

707. Ambulance Loading Points (ALPs)

- a. Casualties will be loaded into ambulances and other transport at ambulance loading points for movement to the ambulance station. These loading points should be sited as far forward as possible and if roads are clear of debris they will be located at the rescue sites.
- b. At each ambulance loading point an officer or NCO from the survival column will control loading of ambulances.
- c. Evacuation to the ambulance station will be in the ambulances organic to the ambulance station, supplemented by vehicles from the transport pool operated by the survival group transport company.

SECTION 5—SECOND ECHELON CARE**708. Ambulance Station**

- a. *Organization.* Formed by a portion of the supporting field ambulance, the ambulance station will consist of at least a section, but may consist of a complete clearing or medical company, depending on the casualty load. It is the first point in the evacuation chain where professional medical care is rendered and will include two or more medical officers; and it would likely be where all ranks of the RCDC would be employed in their para-medical role. Volunteer aid detachments may be provided by the St. John's Ambulance (Nursing and Ambulance Division), the Canadian Red Cross Society and other voluntary organizations. Their function would be to provide litter bearer services and nursing facilities for domiciliary and sustaining care.
- b. *Function.* The ambulance station is essentially a sorting and staging installation where preliminary sorting is done and sufficient treatment is given to sustain the patient through further evacuation.
- c. *Siting.* The ambulance station will normally be sited initially on the column rescue axis just outside of the GREEN line to the rear of the survival column it is supporting. It should be moved forward as the GREEN line moves forward.
- d. *Sorting.* At the ambulance station medical officers will separate patients into priority groups for evacuation.
- e. *Decontamination.* Patients who are not disabled and who are capable of ministering "self-aid"—or capable of decontaminating themselves—will have been decontaminated before they reach the ambulance station. The decontamination of other patients will be a medical responsibility and will be carried out in a medical decontamination centre established close to the ambulance station. Ambulance stations themselves must not become decontamination centres under any circumstances.

- f. *Documentation.* The sudden arrival of mass patients will tend to distract from the need for documentation. Every effort must be made to resist this tendency. At the same time, records must be kept simple so that they can be completed quickly and accurately.
- g. *Evacuation.* The ambulance station will be cleared by the ambulance transport company, an improvised emergency health services unit.

709. **Advanced Treatment Centre**

The advanced treatment centre is an improvised installation established by the emergency health services. It performs the same function as the CFMS ambulance station and will augment the ambulance stations supporting the survival columns.

SECTION 6—THIRD AND SUBSEQUENT ECHELONS OF CARE

710. The third and subsequent echelons of medical care are the responsibility of the provincial health authorities.

711. The final destination of seriously injured patients will be the fourth echelon definitive care hospital.

SECTION 7—MEDICAL SUPPLIES AND MATERIEL

712. **General**

- a. Rigid control and supervision will be exercised over medical matériel and supplies to ensure that they are used to the best possible advantage.
- b. Because of the enormous quantities of stocks needed, and as it is unlikely that a normal system of replenishment would be functioning during the first twelve hours after an attack, survival groups and field ambulances will carry at all times their full entitlement, based on current scales and equipment tables.

713. **Medical Supplies**

- a. *Control and Provision.* Each command has a large reserve of medical supplies (ie, stores, equipment and supplies needed for the medical role and issued by the CFMS supply system) the bulk of which are held in the medical supply depots and controlled by the Command Surgeon. A portion of the command reserve, however, will be allocated to target area surgeons for storage within operational distance of the target area.
- b. *Replenishment.* Survival groups will demand on the supporting field ambulance which will provide from its reserve stock and replenish from the target area reserve.

714. **Medical Matériel**a. *Control and Provision*

- (1) Medical matériel includes equipment and supplies needed for the medical role but not provided by the CFMS supply system. It includes such items as litters and blankets for medical use. Initially, items of medical matériel are drawn in the normal manner from the appropriate depots (RCE, RCASC and RCOC) in accordance with current scales and equipment tables.
- (2) Items of medical matériel, particularly litters and blankets, tend, during operations, to drain away to the rear faster than they are replaced. To cope with this problem and to provide for a heavy casualty load two procedures will be adopted:
 - (a) A reserve will be established at each echelon in the evacuation chain.
 - (b) A system of property exchange will be established at each echelon.

SECTION 8—HANDLING OF THE DEAD

715. a. There will be a need for the CFMS to establish temporary mortuaries adjacent to ambulance stations where patients who die while under medical care can be placed pending implementation of the plan for burial.
- b. It may also be necessary for the survival columns to establish temporary mortuaries at rescue sites for the same purpose. It is emphasized, however, that the main tasks of survival columns are rescue and first aid and the handling of the dead will therefore be restricted to such action as may be necessary for reasons of morale or health.

CHAPTER 8

DAMAGE ASSESSMENT

(PROVISIONAL)

SECTION 1—INTRODUCTION

801. a. The Canadian Army has been allotted responsibility for the assessment of damage and casualties from attack and fallout.
- b. In the event of nuclear attack, the federal, provincial and municipal governments will need information about casualties and the damage which the country has suffered. This information is essential so that resources in population and material can be determined and:
- (1) relief can be provided for devastated areas,
 - (2) plans can be made for the recovery of the country, and;
 - (3) steps can be taken to support the country's war effort.

802. The assessment of damage and casualties by the Army is the first step in a process of resources analysis in which a number of civilian agencies have a part to play. These agencies will take the information provided by the Army and interpret its significance in terms of the specific resources in which they are interested. To do this, they will need to know the distribution of essential resources such as food, fuel, transport, hospitals and medical supplies. The compilation and maintenance of information on these subjects is the responsibility of individual agencies under the Wartime Resources Analysis Programme, which is co-ordinated by an inter-departmental working group. The Army's responsibility is confined to the provision of an estimate of the degree of damage and the casualties suffered.

803. a. Following an attack three categories of damage and casualty information will be of concern to the Army to meet:
- (1) The need to provide information to the government as outlined in paragraph 802.
 - (2) The need of commanders at every level to know the state of their units and logistic resources.
 - (3) The need of the target area commanders for information on which to plan and conduct their re-entry operations.
- b. The purpose of this chapter is to cover the method by which the Army will provide the various levels of government with estimates of casualties and damage.

SECTION 2—PLANNING AND CONDUCT

804. **General**

- a. There are three methods of conducting damage assessment:
 - (1) Application of nuclear effects data
 - (2) Photographic interpretation
 - (3) Physical reconnaissance.

805. **Application of Nuclear Effects Data**a. *General*

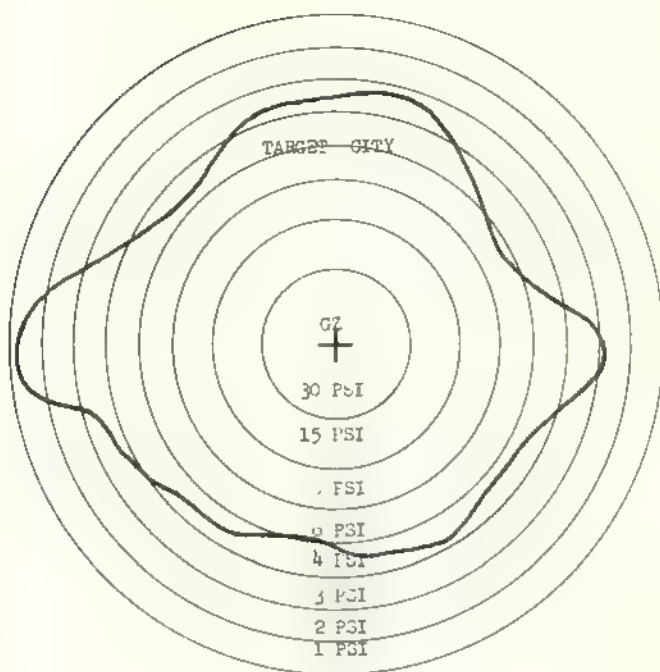
- (1) Upon receipt of NUDET reports, initial estimates of damage and casualties will be prepared using effects data, and will be provided to provincial and federal government officials in emergency headquarters. Although the approximate effects of blast can be predicted those of fire cannot because of variations in atmospheric conditions which may restrict or increase the range of thermal radiations. Neither will it be possible to forecast what effect fire-fighting measures will have in controlling fires.
- (2) The advantage of this method is that it can be used simultaneously at every level of command to give an initial estimate of the damage. Subsequent air and ground reconnaissance will fix more accurately the location of ground zero and the yield and height of burst of the weapon. Refinements will then be made to original estimates as they are passed through the chain of command.

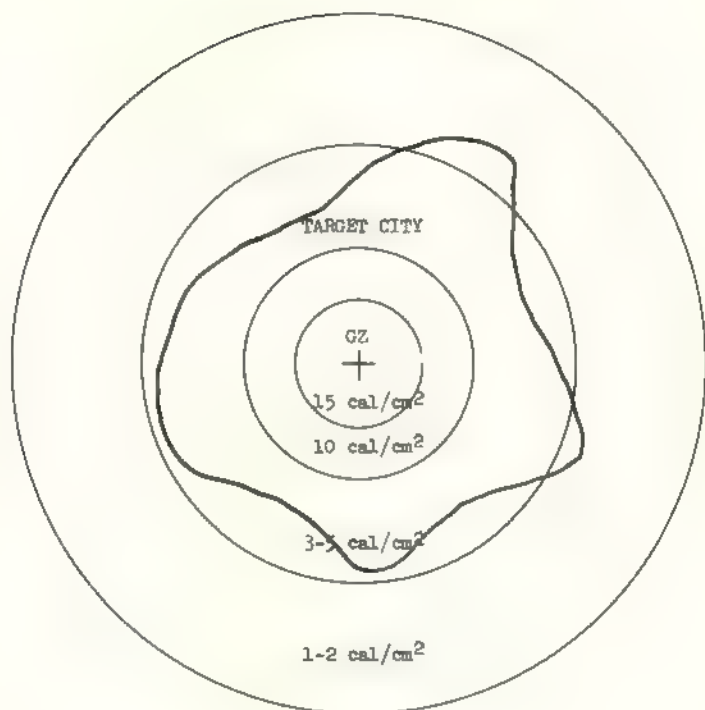
b. *Data On The Effects Of Nuclear Weapons*

Nuclear effects data are available from studies of the Nagasaki and Hiroshima detonations and from weapons trials conducted since the Second World War. These data, in the main, were based on relatively small yield (kiloton) weapons. By the use of scaling laws, however, approximate peak overpressures, approximate duration of blast and approximate thermal effects can be computed for weapon yields from one kiloton to twenty megatons.

c. *Estimate of Initial Damage*

- (1) The method used in re-entry operations of indicating degrees of damage, illustrated and defined at plate 9, is a useful means of showing the areas of greatest damage to the city as a whole. It does not indicate, however, the spread of fires nor is it of much value in estimating the damage to particular structures since effects on buildings depend on the type of construction and vary widely.
- (2) The information provided by the NDFRS (ground zero, height of burst and yield) will permit an

PEAK OVERPRESSURES

THERMAL RADIATION**NOTES: (BASED ON A 5 MT WEAPON)**

- 15 cal/cm² — LIGHT CLOTHING IGNITES.
- 10 cal/cm² — 3rd DEGREE BURNS
- 3-5 cal/cm² — SHREDDED NEWSPAPER IGNITES.
- 1-2 cal/cm² — BLACK RAYON TWILL CURTAIN LINING IGNITES.

initial estimate of damage suffered by a target by the application of scaling laws to nuclear effects data. The army will provide the radii to which different peak overpressures and thermal radiation intensities can be expected to extend. This information will enable technically trained personnel to make estimates of the damage both to structures and to their contents. The radii for the following overpressures and thermal radiation intensities will be provided:

(a) *Peak Overpressures (illustrated at plate 24)*

30 psi	4 psi
15 psi	3 psi
8 psi	2 psi
6 psi	1 psi

(b) *Thermal Radiation (illustrated at plate 25)*

15 Cal/cm ²	— ignition of light clothing
10 Cal/cm ²	— 3rd degree burns on exposed skin
3 - 5 Cal/cm ²	— shredded newspaper ignites
1 - 2 Cal/cm ²	— black rayon twill curtain lining ignites

- (3) Some agencies may need finer definition of the radii of weapons effects. These can be provided in the form of graphs and tables to which scaling laws can be applied. Circular slide rules exist which can provide the same information.
- (4) The provision of peak overpressures and thermal radiation intensities will enable government departments to make the most accurate assessment possible under the circumstances. However, there will be a need for broader use of a more easily applied system for point analysis. This will be provided through a variation of the damage ring method by which radii of damage will be shown for each of the common types of structure or facility including residential, commercial and other types of buildings, communication and transport facilities, forests, etc. An example of this damage-distance relationship for various yields and height of burst is shown at plate 10.
- (5) After the attack the Army will provide the location of ground zero, height of burst and the yield of the weapon. Government departments and agencies can then apply the appropriate data to their maps on which their resources have been plotted. They can then estimate the damage that has been inflicted upon the individual structures

in which they are interested. They may also wish to determine the damage to the contents of these structures but this will be difficult to do using this system.

- (6) The Army will use the two methods outlined above to provide information on which the initial estimate of damage can be based. The damage report as shown should be available in a matter of minutes.

Damage Report

NUDET 03

HOB—SURFACE TOB 052216Z

YIELD—5000 KT GZ MONTREAL 11439

DAMAGE ZONES RADII—A-2, B-5, C-8, D-12
(in miles)

OVERPRESSURES RADII

	Yds		Yds
30 PSI	3,250	4 PSI	9,750
15 PSI	4,500	3 PSI	11,800
8 PSI	6,500	2 PSI	15,400
6 PSI	7,800	1 PSI	25,000

THERMAL RADII

	Yds
15 Cal/cm ²	= 14,000
10 Cal/cm ²	= 17,000
3.5 Cal/cm ²	= 27,000
1.2 Cal/cm ²	= 42,000

REMARKS:

- (7) For resources analysis, government departments and agencies will apply the effects data, in the form presented by the Army, to their own material.

d. Revised Assessment of Damage

- (1) The first valid evidence on which the initial estimate of damage can be revised will probably come from observation by aircraft controlled by target area headquarters. On the basis of this observation it will be possible to determine with considerable accuracy the location of ground zero, height of burst, yield, and the effect of ground contours and meteorological conditions on original estimated damage radii. This reconnaissance will also be able to provide information on the spreading of

fires. As a result the Army will produce a revision to the NUDET, as shown, which will be more accurate than the original report and will include a general description of conditions:

NUDET 03 Revised

HOB—SURFACE TOB 052216Z

YIELD—3000 KT GZ MONTREAL
114410

DAMAGE ZONES RADII—A-1.5, B-4, C-6, D-10
(in miles)

OVERPRESSURE RADII

	<i>Yds</i>		<i>Yds</i>
30 PSI	2,750	4 PSI	8,230
15 PSI	3,800	3 PSI	9,950
8 PSI	5,490	2 PSI	13,000
6 PSI	6,650	1 PSI	21,000

THERMAL RADII

	<i>Yds</i>
15 Cal/cm ²	= 11,500
10 Cal/cm ²	= 15,000
3-5 Cal/cm ²	= 22,000
1-2 Cal/cm ²	= 35,000

REMARKS: EXTENSIVE FIRES EXTEND
TO POINTE AUX TREMBLES,
CARTIERVILLE, LACHINE
AND CAUGHNAWAGA

- (2) Government departments and agencies can then apply this to their own structures as plotted on their maps of the target area.
- (3) As further information is received at target area headquarters from ground and air observation, damage information will be published to all concerned.

806. Photographic Interpretation

Aerial photographs will be of great value in assessing the degree of damage suffered. There may be limitations on the speed with which photographs can be produced. Radiation may be of such intensity that film will be affected and weather conditions, smoke, dust, and the time of day are also possible obstacles. Time is required to process and distribute prints before interpretation can begin. As soon as post-attack air photos are available, Army air photo interpreters will study them in order to define the areas of complete damage as well as the various peak overpressure rings. The results of fires will also be apparent to the air photo interpreter.

He can indicate burnt out areas and if the photos are taken early enough can indicate existing fires. The areas of damage will no longer necessarily be outlined by concentric rings. It will therefore be necessary to distribute the resulting damage information by means of overlays or, in the worst case, by lists of co-ordinates.

807. Physical Reconnaissance

- a. This method of damage assessment has many limitations. It is time consuming, subject to restriction by residual radiation and rubble, and requires large numbers of personnel. It is, however, the most accurate means of determining the situation at a given location. It will undoubtedly be necessary to conduct physical reconnaissance to ascertain the state of many vital commodities or facilities. Since the area of damage will be very large from any nuclear burst it will be impossible for the Army to inspect and report upon all the installations in the damaged area. In general it is the intention to provide information by the other means which have been described. However, there may be particular installations that require reconnaissance on the ground. This will be done in special instances within the knowledge and limits of resources available to the Army. However, if an agency requires a technical report on resources of interest to it, that agency should provide the specialist to carry out the inspection. The Army will provide a guide service to indicate the areas that are accessible and will provide information on the radiation hazards involved.
- b. It should be remembered, however, that the Army's primary role in the target area is the saving of lives. This task is of such magnitude that it will require the undivided attention of the target area commander and his staff. Special requests for information should be kept to a minimum.

808. Damage From Fallout

The methods of assessment outlined in the preceding paragraphs deal with the direct effects of nuclear weapons. It is also necessary to determine the effects of fallout, to assess the casualties it may cause and the damage which may result to commodities and resources which are subjected to it. The initial forecast of fallout patterns made for warning purposes is not of much use in damage estimation. Once fallout is down, however, ISORAD maps based on intensity reports received through the NDFRS will be available showing the areas of the country which have been contaminated by fallout. Iso-intensity lines for 25, 250, 1000 and 3000 r/hr at H + 1 will be marked. The Army will make these available to government departments and agencies.

809. Army Aircraft

Army aircraft will be used to conduct visual reconnaissance and to take oblique photographs. Helicopters, if provided at target area headquarters, will greatly enhance both the speed and accuracy of confirmatory reports of damage assessment.

810. RCAF Co-operation

The RCAF will provide the annual pre-strike air photo coverage of the target cities and the immediate post-strike air photography. They will also provide courier service to carry post-strike photographs from the base airfields to target area headquarters, regional headquarters and emergency headquarters and for the delivery of fallout maps. Further information will be provided on the procurement of air photographs and on the organization and control of their use.

CHAPTER 9

MAINTENANCE OF LAW AND ORDER

SECTION 1—INTRODUCTION

901. General

- a. The Army's responsibilities for the maintenance of law and order in survival operations are:
 - (1) The direction of the police in seriously damaged or heavily contaminated areas in which the army is carrying out re-entry operations.
 - (2) The provision of emergency support to provincial and municipal authorities in the maintenance of law and order, and in dealing with panic or the breakdown of civil authority.

902. Seriously Damaged Areas

- a. Following a nuclear attack it is anticipated that a large number of the survivors will attempt to move to the outskirts of the damaged area. At the same time, surviving members of the armed forces and the warden service, if established, will make every effort to organize volunteers into work parties to fight fires, control movement, render first aid, and begin rescue operations. With the arrival of the army survival columns, rescue and first aid operations will continue on a much greater scale and more volunteers will be brought under organized direction.
- b. During the period of re-entry operations the dominant mode of behaviour among most survivors will likely be a kind of passive disorganization, ie, they will not panic or exhibit any kind of aggressive behaviour. Many will be suffering from shock and crowds should be easy to control. Police duties other than the control of movement should not therefore present a serious problem.
- c. If a sufficient number of civil police have survived the nuclear strike, they will form a nucleus on which the law enforcement organization, operating under Army direction within the damaged area, will be based. This eventuality should be provided for in pre-attack planning as it must be accepted as a principle that civilian police will be fully utilized before military forces are used on law enforcement duties.
- d. If there are few civilian police among the survivors, it will be necessary to provide army personnel for essential law enforcement duties within the damaged area. It is emphasized, however, that the main task of the army

during the re-entry phase is the saving of lives and the number of troops provided for law enforcement duties will be kept to an absolute minimum with civil police taking over these duties, under army direction, at the earliest possible moment.

903. **Heavily Contaminated Areas**

- a. In heavily contaminated areas where the Army is conducting operations, the main tasks will be the control of traffic and movement and the enforcement of restrictions imposed upon the civilian population.
- b. The civil authority command structure should normally be intact in heavily contaminated areas and the Army's participation will be confined mainly to the issuing of general directives on the action to be taken by civil authorities to ensure the safety of the population. Because of the magnitude of these operations, however, which may be conducted in areas extending up to several hundred miles, the police may be unable to meet the commitment and the Army may find it necessary to provide small detachments, equipped with radio, to augment the police. These attachments should, if possible, be provided by the C Pro C.

904. **Emergency Support to Civil Authorities**

- a. Major problems in connection with the maintenance of law and order will likely begin two or three days after a nuclear attack when adequate shelter and essential commodities are at a premium. As this situation could exist anywhere in the country, the Army may be required to provide emergency support to the civilian authorities not only in or close to damaged or heavily contaminated areas, but in areas many miles distant.
- b. The provision of emergency support in this task is in addition to the aid of the civil power for which the Army is liable under Part XI of the National Defence Act and the Department of National Defence policy which provides for assistance to civil authorities in matters generally described as civil emergencies. However, the procedures and principles laid down for the guidance of the Army when acting in aid of the civil power, where they relate to the use of firearms and the handling of crowds, would be used as a guide in survival operations and would be followed as far as practicable.

905. **Panic**

- a. Studies conducted on the reaction of the public in large scale disasters in the past indicate that the problem of dealing with panic would not likely arise in many localities after a nuclear attack. There have been few

instances in the past of mass panic directly connected with enemy attacks on civilian population or large-scale disasters such as explosions and tornadoes.

- b. Experience has shown that terrified people who have been stunned by an overwhelming disaster are in a highly agitated state for a very short time, and excited and irrational behaviour can usually be prevented if effective leadership and accurate, realistic information is provided.
- c. It has been found that in large-scale disasters, including the atomic bomb attacks on Japan, the people who were the most upset and terrified at the outset soon became extremely docile and were easily induced to conform to the rules and regulations of the local authorities.

906. **Breakdown of Civil Authority**

- a. In the period following a nuclear attack it is conceivable that an emergency could arise, particularly in a reception area inundated with evacuees, which would result in the breakdown of civil authority. Under the provisions of the Civil Defence Order, the Army would then have the responsibility for maintaining law and order and taking such other action as considered necessary until relieved of this duty.
- b. Since arrangements exist which ensure the continuity of government at the federal and provincial level, it is envisaged that any breakdown of civil government would likely be at the municipal level. Although the Army would have the responsibility for maintaining law and order under such circumstances, the assistance and co-operation of any portion of civil government still capable of functioning would be essential.
- c. Control of the area in which a breakdown of civil authority occurred would revert to the civil authority at the earliest possible moment. If it appeared there would be a delay in the original municipal civil authority taking over, the provincial civil authorities could be expected to assume control. In such circumstances it might be necessary for the Army to provide further assistance in the form of aid to the civil power for a short period of time.

SECTION 2—BASIC PRINCIPLES

907. When the Army is performing duties connected with law enforcement in survival operations the following principles will apply:

- a. In Canada the civil authority is supreme and, when functioning, it can be aided but not superseded.
- b. The sole object of military aid to the civil power is the restoration of law and order by military means when other methods have failed, or appear certain to fail

- c. Military commanders at all levels must have a readiness to seek and respect the advice of civil and police authorities.
- d. The establishment of mutual confidence between the civil, police and military authorities at all levels is of paramount importance.
- e. When enforcing law and order, the armed forces will not use more force than is necessary, ie, they will use the minimum amount of force needed to achieve the immediate aim.
- f. It is vital to keep the public informed. As in all other aspects of survival operations, public understanding and acceptance of emergency measures will be an important factor in the success of the operational plan.
- g. The military plan must be based on sound and accurate intelligence. Rumours and exaggerated accounts of incidents will be plentiful. The rapid establishment of a network of trained, reliable observers will be essential.
- h. Once a request has been made for military assistance of any kind, the military commander, irrespective of his rank, is entirely responsible for the form which the action will take and the amount of force used, although he will naturally be guided by the advice of civil authorities and the police. The military commander's plan must result from his own personal enquiry and appreciation.
- j. When practicable, the respective duties of the police and the military should be recognized as being distinct. It is highly undesirable to use soldiers as policemen any more than is absolutely necessary.
- k. When soldiers must be employed on police duties, regular units will normally be used because of their training and organization. If survival columns are diverted to tasks involving maintenance of law and order, civilian volunteer working with the columns will be handed over to another unit or, alternatively, given a rescue task under appropriate civilian or military direction.
- l. Prompt and vigorously pursued objective action is the surest way of restoring order. This need not conflict with the principle of the use of minimum force, on the contrary, it should facilitate its intelligent application.

SECTION 3—PLANNING

908. General

- a. Although improvisation and ingenuity will be essential in the implementation of plans for the maintenance of law and order, many of the difficulties can be foreseen and should be anticipated and catered for in pre-attack planning.

- b. Army commanders at all levels must work in close co-operation with civil authorities and police in preparing plans for the various contingencies described in section 1 of this chapter.

909. **Planning Considerations**

- a. Following are the main factors to be considered in planning:
 - (1) *Control of Movement.* This is the key to the success of any plan for the maintenance of law and order in an emergency. It includes traffic control, crowd control, and evacuee control.
 - (2) *Use of Civil Police.* Civil police must be used to the fullest extent. The Army will supplement or act in lieu of police only when there is no alternative.
 - (3) *Communications.* Adequate communications are essential for the rapid passing of information.
 - (4) *Chain of Command.* When the Army is responsible for the direction of police forces, this direction should be issued to the police through one senior police officer who would co-ordinate all police forces in the area. Policemen would then receive instructions through their own officers over their own communication networks.

SECTION 4—CONTROL OF MOVEMENT

910. **General**

- a. The control of movement in survival operations will be one of the most formidable tasks facing civilian and military authorities and high priority must be given in pre-attack planning to a movement organization and co-ordinated movement plan.
- b. If warning is received before an attack there might be considerable voluntary evacuation from target areas. The responsibility for controlling this evacuation rests with the civil authorities. They may, however, request emergency army support. This support would likely be in the form of "military assistance" in accordance with the DND policy of providing assistance to civil authorities in matters other than the maintenance of law and order.
- c. Notwithstanding any emergency support of civilian authorities, the Army must be prepared to assume complete control in the area of heavy damage immediately following an attack.

911. Provincial Planning

- a. To be effective, planning for the control of movement should be carried out at the provincial level. It is expected that provincial planning for the control of movement will:
 - (1) Provide a master traffic and movement control plan for the province as a whole with detailed plans for likely target areas. In places, plans will have to be co-ordinated with other provinces and, possibly, states in the U.S.A.
 - (2) Allocate assembly, transit and reception areas in relation to the traffic plan.
 - (3) Co-ordinate and define the responsibilities of the federal, provincial and municipal police forces for the control of traffic and evacuees.
 - (4) Be co-ordinated with the army plan for target areas so that the Army's tasks and responsibilities are clearly understood.

912. Control of Movement During Re-entry Operations

- a. *General.* The two basic movement problems during re-entry operations will be:
 - (1) Controlling the movement required to clear the way for the speedy entry of the rescue forces into the area and the actual conduct of rescue operations, including the evacuation of casualties.
 - (2) Controlling the movement of evacuees.
- b. *Reconnaissance.* A principal task of the target area reconnaissance troop will be to obtain information on the condition of routes. This information will be passed back to target area headquarters.
- c. *Move—Rescue Forces.* Rescue forces must move quickly and their move must be unimpeded. This may mean that advance elements of the survival platoons may have to detail men for traffic control duties to clear the roads of evacuees. These men would be relieved at the earliest possible moment by members of the police platoon or by civilian police or civilian police auxiliaries.
- d. *Control.* All movement control forces in the damaged area, both civil and military, will be under the control of the target area headquarters.
- e. *Communications.*
 - (1) Effective communications will be essential. Target area headquarters will have direct communication to the reconnaissance troop and to the sector headquarters. There must also be communications from the target area headquarters to the traffic posts established by the police platoon.

- (2) Target area headquarters must be able to communicate directly with any civilian police, who will be operating under army direction, within the damaged area. This will normally be done through the senior civil police officer on the target area headquarters staff who should have a radio transmitter on the civilian police radio network.

F. Control Measures.

- (1) Information from the reconnaissance troop and from helicopter reconnaissance (if available) will indicate to the target area commander the availability and condition of routes within a damaged area. Based on this information he will select the routes for rescue forces, for casualty evacuation and for evacuees. These may conform to routes selected during the planning phase and included in the re-entry plan.
- (2) Re-entry routes must be kept clear and signs should be placed on these routes at frequent intervals for the information of rescue forces and evacuees.
- (3) Intersections of re-entry and evacuation routes must have at least one pointsman.
- (4) Traffic posts, manned by a minimum of four men, will be established at critical points along re-entry and evacuation routes. These posts will have wireless or line communication to target area headquarters and will be responsible, within their areas of responsibility, for:
 - (a) Signing re-entry and evacuation routes.
 - (b) Intersection control.
 - (c) Provision of information posts.
 - (d) Route patrols.

G. Evacuee Control.

- (1) The following action must be taken when establishing an evacuee control system in the area of re-entry operations:
 - (a) Whenever possible, a route in each survival column area of responsibility will be designated as the evacuee route. It will be signed from a point as far forward as possible.
 - (b) Feeder routes to the main evacuee routes must be designated and signed.
 - (c) All persons engaged in the control of movement and all members of the rescue forces must know where routes are located so that evacuees can be directed to them.
 - (d) A series of control points will be established on each route to inform and direct evacuees.

- (e) One or more staging areas should be set up on each evacuee route where evacuees may be held for a limited period. These staging areas should be located outside of the area of actual operations and, where possible, should be under civilian control.
- (f) Evacuees should be directed along evacuee routes to reception communities.

SECTION 5—CROWD CONTROL

913. General

- a. Most crowds will not, as a rule, resort to violent action. However, any crowd that gathers during a serious emergency, especially when there is a shortage of adequate shelter and basic commodities, is potentially aggressive and could become hostile.
- b. The following paragraphs deal with some of the actions normally taken by aggressive and hostile crowds and suggest counter-measures:
 - (1) *Verbal Abuse.* Under no circumstances will troops join in an exchange of heckling or make any reply to taunts and jeers from a crowd.
 - (2) *Attacks on Small Groups.* Attacks on individuals or small groups of soldiers may be made. Small detachments or picquets should not therefore be posted where they cannot reasonably defend themselves.
 - (3) *Throwing Objects.* An aggressive crowd will invariably throw a barrage of rocks, sticks or mud at any opposing force. Troops will not return this barrage but will remove the source, if possible, eg, picqueting brick-yards, rock piles, etc. Troops may have to withdraw to a safe distance until segregation operations begin.
 - (4) *Dropping Objects from Roofs.* To counter this, roof-clearing detachments should be formed and posted.
 - (5) *Fire.* In extreme cases, members of the crowd may set fire to buildings or use gasoline fires to gain their ends. Since a crowd cannot remain any closer to a fire than the troops, the situation may be turned to advantage by quickly deploying men from another flank, or from the rear. When fire is used the officer commanding the troops must not be too hasty in using his force as firefighters. This may be what the leaders want.
 - (6) *Explosives.* Crowds may use, or threaten to use, dynamite or explosives. The first step is to estab-

lish whether they actually possess the explosives, and, if so, the location of their intended use. If the threat is confirmed the only recourse is to withdraw temporarily and lay down a heavy concentration of chemicals, eg, tear gas. If available, armoured vehicles could be used to maintain control while a special squad deals with the situation.

- (7) *Firing at Troops.* This is by far the most serious situation facing the officer in command of the troops. He must not be stampeded into ordering large-scale return fire. He must establish whether the fire is general or from one or two fanatics in the crowd, and whether it was aimed or merely random shooting. If the persons responsible are in the centre of the crowd, he should attempt, by accusations of cowardice, etc, to bring them forward. If the fire is deliberate and on a large scale, he must either withdraw or order the return of aimed fire. (See paragraph 914)
- (8) *Panic.* Panic caused by fear may be found in an "escape crowd" fleeing from disaster or the threat of disaster. The primary cause of panic is the blocking of the escape route or routes. Action should therefore aim at providing escape routes and at directing and controlling the crowd along these routes. At the same time, the crowd should be divided, if possible, into smaller groups. Techniques of control include:
 - (a) Displaying a helpful, calm and confident attitude. Loudspeakers should be used to give direction and information.
 - (b) The use of rational members of the crowd to calm or isolate hysterical persons.
 - (c) Physical assistance to the injured and weak.
 - (d) Using the power of suggestion, eg, by using such terms as "this way" or "follow me".
 - (e) Use of vehicles to lead the crowd.
 - (f) Use of troops to block off routes so that movement can be channelled in the desired direction.

914. Use of Firearms

The use of firearms by troops employed on crowd control is normally confined to a display of weapons for their psychological effect. In extreme cases it may become necessary to fire on a crowd. The circumstances which would warrant such serious action and the general principles and procedures to be followed are contained in Chapter 23 of QR (Army) and in instructions issued by each army command.

915. **Training and Attitude**

Duty of this nature is one of the most trying that can be imposed on any force or individual. It may involve conflict with fellow citizens. The attitude of the troops must be impartial and calm; good discipline is essential. Troops must be prepared to accept all manner of verbal abuse without loss of temper. When force becomes necessary, it must not be excessive. The primary demand is for soldiers who are alert, smart and well-disciplined. The sudden appearance of a smartly-turned-out body of troops acting in unison and steadfast is a great deterrent to any potential trouble-makers.

SECTION 6—SECURITY PATROLLING

916. **General**

- a. Security patrols are an effective method of preventive policing and are used in their normal duties by the C Pro C. The employment of other members of the Army on these patrols contravenes the principle that soldiers should not normally be used as policemen if it can be avoided. There may, however, be a need for relatively large numbers of security patrols during survival operations and all members of the Army must be trained in security patrolling.
- b. During the re-entry phase of operations when the main task will be the saving of lives, the police, under the direction of the Army, may be able to provide all necessary security patrols, relieving the Army of this duty. If there are not enough police to perform this function, the Army may be required to provide the essential patrols necessary to ensure that rescue and first aid operations are not hampered and to prevent serious crime.
- c. Security patrolling is more likely to be needed, however, when the Army is assisting the civil power, after civil police have been unable to cope with looting and other difficulties arising from the shortage of shelter and essential commodities.

917. **Organization**

- a. A unit or sub-unit detailed for security patrolling should retain, as far as possible, its basic command structure. Within this structure, the organization for security patrolling is:
 - (1) a patrol headquarters
 - (2) mobile patrols
 - (3) foot patrols
 - (4) a reserve or stand-to patrol

918. Tasks

- a. Security patrols will be given specific tasks in relation to the control of individuals, the protection of property, and the reporting and marking of hazards, as follows:
 - (1) *Control of Individuals.* This will include assistance and guidance to the lost and injured as well as the prevention of crime.
 - (2) *Protection of Property.* Essential commodities, particularly food, must be safeguarded by patrols or picquets. Valuable items may have to be removed from the area, tabulated, and stored in a secure place so that they can be identified and claimed later by the owners.
 - (3) *Hazards.* Patrols will report and, if necessary, temporarily picquet any unsigned hazards which are discovered.

919. Planning

- a. The following factors should be considered when planning security patrols:
 - (1) Early reconnaissance is essential. Large scale maps and town plans should be used as a basis for reconnaissance.
 - (2) Troops must be thoroughly briefed.
 - (3) Constant liaison with civilian authorities, especially police, is essential.
 - (4) An efficient system of communication must be maintained between patrol headquarters and patrols.
 - (5) A reserve must be maintained at patrol headquarters to be used in emergencies.

920. Methods of Patrolling

Detailed information on the method of patrolling, using foot and mobile patrols and the beat system, is contained in CAMT 10-1 (Provost Duties).

921. Power of Arrest

- a. Anyone, including a member of a security patrol, has power to arrest without warrant a person he finds committing an indictable offence. An offence is indictable when so prescribed in the Criminal Code of Canada. All serious offences, including treason, riot, theft and assault, are indictable as are most other offences which are likely to concern security patrols.
- b. When called out in aid of the civil power under the National Defence Act members of the forces have, under section 225, the powers of constables. This authorizes a member to arrest without warrant anyone he finds

committing any criminal offence and to arrest without warrant anyone he reasonably believes has committed or is about to commit an indictable offence.

- c. Such force as is necessary to effect arrest may be employed as long as the force used is not excessive.
- d. Members of security patrols have adequate authority to effect arrest to enable them to discharge their duties.

922. Summary

Armed Forces personnel employed as security patrols face a difficult and arduous task. They will be called upon to present a disciplined appearance in the face of chaos and will be required to make seemingly harsh decisions amidst human misery. Patrol members will operate for long periods under difficult circumstances and will have to be self reliant. A high standard of individual discipline and training is essential. Careful planning, organizing, briefing and supervision are imperative if the aim is to be achieved. The soldier dealing with civilians must use common sense and be humane if he is to win the respect and obedience of those he seeks to control.

CHAPTER 10

EMERGENCY COMMUNICATIONS

SECTION 1—INTRODUCTION

1001. a. To ensure the continuity of the functions of the federal government should a major war occur, a federal emergency headquarters complex and emergency regional sites for federal administration in Canada are being provided. A centre will be provided in each province from which a small core of federal, provincial and army personnel can direct operations within the province under emergency conditions such as:
- (1) periods of radioactive fallout,
 - (2) the loss of normal means of communication; and,
 - (3) the destruction of the federal and some provincial capitals.
- b. Communications will be of vital importance in assuring national survival and in the controlling of survival operations. This chapter describes the communications arrangements being made and responsibilities at the various levels of government.

SECTION 2—CONTROL AND OPERATION

1002. Survival operations will be controlled from the federal emergency headquarters complex through regional headquarters in each province. The regional headquarters will consist of a military component drawn from the appropriate army command and/or area headquarters, a civilian component of federal government and a civilian component of provincial government. The federal and provincial components will comprise ministries, departments or agencies which have a part to play in survival.

1003. Decentralization of control of federal and provincial responsibilities is essential to enable operations to continue independently should central direction be temporarily cut off, and to enable local problems to be dealt with. For this reason, provinces will be divided into geographical zones, each with a zone headquarters working under the overall control of the regional headquarters. In Ontario and Quebec the number of zones makes it necessary to group some zones under an intermediate headquarters called a sub-region. These sub-regional headquarters may, in some cases, correspond to army area headquarters. In addition, federal satellite centres will be established adjacent to regional and sub-regional headquarters.

1004. a. The Army is responsible for communications between the federal emergency headquarters and the regional

headquarters and down to any sub-regional or zonal headquarters and federal satellite centres which may be established.

b. The Army will also provide communications for:

- (1) warning of attack and fallout,
- (2) collection of information on damage and casualties; and,
- (3) forces engaged in re-entry operations or other survival tasks

1005. Communications from federal headquarters to regional headquarters and to sub-regional or zonal headquarters will be based on the CASS and will include leased landline or microwave telephone and teleprinter circuits and army radio-teleprinter circuits. Inter-communication with the RCN and the RCAF will also be provided. These communications will be supported by the commercial long-distance telephone system and by the commercial telegraph systems. Radio back-up in the federal system will, however, normally go down to regional headquarters only.

1006. Communications to the scene of re-entry operations will be provided under army arrangements from regional headquarters to pre-selected target area headquarters located on good communications routes. This will provide a firm communication base for the control of re-entry operations.

1007. Provinces are responsible for their own emergency communications within the province, which include communications within provincial zones or counties and municipalities. Close liaison will be maintained between the appropriate army headquarters and the provincial emergency authorities on communications planning. Provinces will be using existing commercial telephone and telegraph systems, or their own police, fire, forestry or highways communications. In some provinces, independent emergency communication facilities are installed or planned. Radio amateurs will have an important part to play in providing communications, particularly within zones and within or adjacent to urban centres. Taxi radio systems will also be of value, particularly within urban areas.

1008. The provision of communications for survival operations is a joint undertaking involving military and commercial communications organizations working closely with the many other users of communications. No one agency can provide these vital communications alone, and like all other aspects of survival operations, success hinges upon the close co-operation of many separate authorities.

AIR DEFENCE REPORTING AND PLOTTING PROCEDURES

1. General

- a. Air defence reporting procedures within the NORAD complex are under review. Different methods are being tested by NORAD Regions.
- b. RWICs will ensure that methods used are understood by the PWCs with whom they are associated and will work out common practices. RWICs must bear in mind that some PWCs are served by two RWICs. Common procedures must therefore be found.
- c. Reports forwarded to the FWC by PWCs will be in the form of frequent summaries of the air surveillance data. Only authorized abbreviations and those contained in these instructions will be used.

2. Air Defence Surveillance Reports

- a. Air surveillance information consists of reports of the systematic observation of air, surface, or sub-surface areas by visual, electronic, photographic, or other means for intelligence purposes. Air surveillance information is transmitted in the form of a surveillance report (SR). A SR is transmitted in the following parts and sequence:
 - (1) Track classification
 - (2) Track number
 - (3) Special action (only included when necessary)
 - (4) GEOREF
 - (5) Z time
 - (6) Course
 - (7) Number of airborne objects
 - (8) Altitude
 - (9) Speed
 - (10) Remarks (only included when necessary)

3. Track Classification

- a. Track classification is the term applied to the classification of tracks requiring identification according to current NORAD directives.
- b. The following classifications are commonly used:
 - (1) H--HOSTILE — A track determined to be an enemy airborne object.

- (2) **V—HOSTILE** — A track determined to be a simulated enemy airborne object. It is always used with the prefix letter "X", eg, "XV".
 - (3) **F—FRIENDLY** — A track determined to be a friendly airborne object.
 - (4) **U—UNKNOWN** — A significant unidentified track.
 - (5) **K—FAKER** — A friendly aircraft acting as a HOSTILE during an air defence exercise.
 - (6) **S—SPECIAL** — A friendly aircraft carrying individuals of special interest to NORAD, or aircraft, other than SAC, participating in an intra-command mission of interest to NORAD.
 - (7) **X—SYSTEMS TRAINING PROGRAMME** — This letter is used as a prefix to any of the above track classifications from HOSTILE to FAKER. This identifies a simulated track during a synthetic exercise.
 - (8) **C—CANNED** — This letter is used as a prefix to any of the above track classifications from HOSTILE to FAKER. This identifies a simulated track during a synthetic exercise, other than a Systems Training Programme exercise.
- c. Track classifications may be revised, deleted, or added to with little or no warning. Where changes occur the reporting RWIC will send an explanation with the initial SR.

4. Track Number

- a. The track number is a combination of letters and numbers to specify individual tracks. Normally letters designate the originating detection agency and numbers the numerical sequence of tracks originated by the detection agency in that day.
- b. PWCs should contact their associated RWICs for clarification of systems used.

5. Special Action

- a. Special action refers to changes or any other tactical factors affecting the surveillance track report.

b. The following abbreviations are used:

(1) CL—CONTACT

LOST — A track still within radar coverage but no longer discernible due to ground clutter, ECM, or other reasons.

(2) DROP—

DROPPED — No longer being carried by the reporting region.

(3) FA—FADE — A track that has been carried as CL for a minimum of five minutes and not expected to reappear.

(4) MS—MASS — A number of individual tracks in close proximity heading for the same area and being reported as a mass raid.

(5) MG—MERGED — The track has merged with another track or into a raid, or a raid has been merged with another raid.

(6) PR—PRIORITY — The track has been replaced by a higher priority track.

(7) RC—RECLASSIFICATION—The track classification changed.

(8) CH—CHANGE — The track number has been changed.

6. **GEOREF**—is normally given as four letters only.

7. **Z Time**—is the time of the report.

8. **Course**—is shown as common abbreviations of directions.

9. **Number Altitude and Speed**—shown as a series of numbers separated by oblique strokes.

10. Plotting Methods

a. All aircraft track information received at PWCs should be displayed in order that an accurate up-to-date picture is available.

b. This information can be displayed by the use of horizontal plotting tables, vertical screens or charts on which are placed raid stands and arrows or markers. If this system is not considered feasible or practicable, other methods are:

(1) A vertical transparent (plexiglass) plotting screen on which plotting is recorded by chinagraph pencil. The screen should be permanently etched with the

GEOREF grid and major geographical outlines. Plotting is normally done from the rear so that the frontal view is not obstructed.

- (2) A talc covered map on which the GEOREF grid has been marked. Plotting is done by chinagraph pencil. This method is suitable where only a limited number of people need access to the display.

c. Any system adopted by a PWC must display:

- (1) Number of tracks
- (2) Location of raid
- (3) Direction
- (4) Estimated time of arrival over the populated areas

THE WORLD GEOGRAPHIC REFERENCE SYSTEM

1. General

- a. The World Geographic Reference System (GEOREFF) has been specifically designed as a grid reference system for use in air defence and inter-allied reporting.
- b. The system is based on lines of longitude and latitude and consequently may be applied to any military map. A single, brief, systematic code gives positive and unique identification to any position on the earth's surface within an area of approximately one square nautical mile.

2. Description of the Grid

a. Step 1

- (1) The earth's surface is divided into areas or quadrangles 15° by 15° . Since there are 360 one-degree lines of longitude, there are 24 longitudinal zones. Since there are 180 one-degree parallels of latitude from pole to pole, there are 12 latitudinal zones of 15° . There are, therefore, 288 quadrangles produced by this division of the earth's surface.
- (2) Each quadrangle is allotted two letters to identify it. The letters I and O have been omitted to avoid confusion with the digits one and zero.
- (3) The lettering starts at 90°S and 180°W , each longitudinal and latitudinal zone being lettered in alphabetical succession.
- (4) The lettering of the earth's surface is shown at Appendix 1. Each pole has been separated or stretched to a distance equal to the circumference of the earth at the equator to illustrate the lettering system.

b. Step 2

- (1) Each 15° by 15° quadrangle is again divided into 1° by 1° quadrangles to produce 225 one-degree quadrangles in each major quadrangle.
- (2) Each of the smaller quadrangles is lettered alphabetically west to east and south to north using letters A to Q, I and O again being omitted. See Appendix 2 Table 2.
- (3) Each one-degree quadrangle now can be identified by means of four letters, the first two indicating a specific 15° quadrangle and the second two indicating a specific 1° quadrangle within that 15° quadrangle.

c. *Step 3*

- (1) The 1° quadrangles are further divided into lesser areas of 10 minutes by 10 minutes and are designated west to east and south to north by the numerals 0 to 5 inclusive.
- (2) Each 10' area may be further divided (by visual estimation) into 100 one-minute quadrangles and are numbered from zero to nine inclusive.

d. *Example*

- (1) Table 3 Appendix 2 provides an example showing the subdivision of a 1° area BA.
- (2) Assuming this area to be a part of the 15° zone HK the position "A" would be given in full as "HKBA 0525" where:
 - (a) HK is the 15° zone
 - (b) BA is the 1° zone within the area HK
 - (c) 05 is the 10' area within the area BA
 - (d) 25 is the position within the 10' area 05.

3. Where no possibility of ambiguity exists, it is permissible to omit the primary letters HK. The position "B" would then be BA 2028.

4. The full grid reference of St. Hubert (Appendix 2 table 3—position "C") is HKBA 3232. The local grid reference is BA 3232. When less accuracy is required the nearest 10' numbers or 1° letters may be used, ie HKBA 32 or HKBA.

MUNICIPAL EMERGENCY SERVICES**1. General**

It is expected that municipal governments will have an emergency planning organization to prepare for emergency situations arising out of nuclear attack. Population centres designated as more likely target areas will be concerned with problems primarily associated with continuity of government and measures which should be adopted to ensure the survival of the maximum number of the population. Other municipalities will be concerned with problems associated with the reception of large numbers of evacuees and casualties, and planning for measures to be taken to counter the threat of radioactive fallout. Although planning and organization in both cases will be similar there will be variations in detail from one municipality to another. The proposed types of municipal services and typical responsibilities are covered in the paragraphs that follow. It is emphasized that the detail may not be applicable to any specific municipality and is included as a guide only.

2. Area Not Designated As A Target Area**a. Health**

- (1) To arrange for the handling of casualties rescued by the Armed Forces during re-entry operations.
- (2) To provide for the care of evacuee casualties.
- (3) To provide continuing health services to the sick and non-casualty cases already in the area.
- (4) To provide for the care of those evacuated from health institutions.
- (5) To organize an emergency health supplies service.
- (6) To arrange epidemic control and immunization programmes.
- (7) To make arrangements for the expansion of health facilities in an emergency.
- (8) To recruit and train auxiliary health services personnel in peace time.

b. Welfare

- (1) To set up and operate welfare centres based upon accommodation earmarked in peace time.
- (2) To provide emergency feeding, clothing, lodging, registration and inquiry and personal services for evacuees.
- (3) To provide for the care of unattached children and dependent adult evacuees.

- (4) To arrange for the institutional care of evacuees of welfare institutions from target areas.
- (5) To provide improvised welfare centres for employment in support of Armed Forces re-entry operations.
- (6) To recruit and train volunteer welfare workers in peace time.

c. *Police*

- (1) To maintain law and order.
- (2) To control and direct traffic.
- (3) To co-operate with other police agencies in the execution of plans for the voluntary evacuation of target areas.
- (4) To support the Armed Forces in re-entry operations.
- (5) To patrol restricted areas and safeguard vital municipal resources and services.
- (6) To recruit and train volunteer auxiliary police in peace time.

d. *Fire*

- (1) To carry out a programme of public and household emergency fire prevention measures.
- (2) To provide mutual aid for other areas.
- (3) To co-operate with other fire services in fire defence operations in damaged areas under Army direction.
- (4) To recruit and train volunteer auxiliary firemen in peace time.

e. *Engineer*

- (1) To supervise the municipal shelter programme, including shelter surveys and technical guidance in the construction of family and group shelters in peace time.
- (2) To maintain public utilities.
- (3) To provide for additional emergency utility services capacity.
- (4) To provide emergency water supplies for the population.
- (5) To provide emergency water supplies for firefighting.
- (6) To support the Armed Forces in the restoration of essential services in damaged areas.
- (7) To co-ordinate the organization and mobilization of private contractors and their engineer resources with the zone engineer.

f. *Communications*

- (1) To provide, as required, communications for emergency municipal government headquarters and the emergency services.

- (2) To establish communication between municipal emergency government headquarters and area or zone headquarters.
- (3) To co-ordinate the use of existing communications facilities; police, fire, radio, telephone, taxis, amateurs, etc.
- (4) To arrange for the provision of extra equipment if required.
- (5) To recruit and train volunteer communications personnel in peace time.

g. *Transportation*

- (1) To provide transport for use in remedial evacuation of people who could not be evacuated in private cars.
- (2) To provide transport for the transfer of evacuees including casualties, who may arrive in reception communities by rail, air or water.
- (3) To provide transport for other emergency services.
- (4) To co-ordinate transport planning with the federal zone transport controller.
- (5) To arrange for facilities for the maintenance and upkeep of transport earmarked for emergency services.

h. *Public Information*

- (1) To co-ordinate a peace-time public information programme.
- (2) To inform the public of the emergency plans of municipal government and emergency services.
- (3) To co-ordinate the municipal government public information programme during an emergency.

j. *Radiological Defence*

- (1) To establish a municipal radiological defence organization.
- (2) To recruit and train radiological monitoring personnel in accordance with standards set by the province.
- (3) To recruit a radiological defence officer for municipal emergency government headquarters.
- (4) To provide information which can be issued to the public on action to be taken within the municipality if it is subjected to fallout.

k. *Rescue Service*

- (1) To develop plans for the utilization of trained rescue workers in conjunction with the Armed Forces.
- (2) To recruit and train volunteers as rescue workers in peace time.
- (3) To organize volunteers for integration into Army re-entry forces.

1. *Warden Service*

- (1) To assist in the dissemination of information to householders in peace time.
- (2) To assist people with the preparation of personal survival plans.
- (3) To ensure that the warning is received by everyone.
- (4) To ensure that the public take shelter on receipt of TAKE COVER WARNING.
- (5) To organize and assist with remedial evacuation if required.
- (6) To provide leadership in their areas of responsibility.
- (7) To recruit and train volunteer wardens in peace time.

3. *Area Designated As More Likely Target Area*

a. *Health*

- (1) To provide for continuing medical services for patients in health institutions and make arrangements for their evacuation.
- (2) To arrange for the evacuation of vital medical supplies.
- (3) To restore and maintain public health services and prevent disease following attack.
- (4) Select shelter areas for patients who cannot be evacuated.
- (5) To make arrangements for the evacuation of medical staffs and their allocation to health facilities in reception areas.
- (6) To recruit and train auxiliary health services personnel in peace time.

b. *Welfare*

- (1) To provide for continuing care for persons in welfare institutions and make arrangements for their evacuation.
- (2) To arrange for the evacuation of welfare staffs and their allocation to reception communities for post-attack duties.
- (3) To provide improvised welfare centres for support of Armed Forces re-entry operations.
- (4) To recruit and train volunteer welfare workers in peace time.

c. *Police*

- (1) To control and direct traffic on evacuation routes and co-ordinate these operations in co-operation with other police agencies.
- (2) To preserve law and order.

- (3) To support the Armed Forces in re-entry operations.
- (4) To recruit and train volunteer auxiliary police in peace time.

d. *Fire*

- (1) To educate the public in peace time in public and household fire prevention measures.
- (2) To train the public in peace time in firefighting procedures so that people could put out small fires following attack.
- (3) To arrange for the mobilization of firefighting equipment and, in conjunction with the Army, develop a fire defence plan.
- (4) To recruit and train volunteer auxiliary firemen in peace time.

e. *Engineer*

- (1) To man essential services following receipt of warning.
- (2) To provide engineer support for implementation of the voluntary evacuation plan.
- (3) To support Armed Forces re-entry operations.
- (4) To provide emergency water supplies for firefighting.
- (5) To restore essential services under Army co-ordination following attack.
- (6) To co-ordinate the organization and mobilization of private contractors and their engineer resources with the zone engineer.

f. *Communications*

- (1) To provide communications for emergency services controlling voluntary evacuation.
- (2) To arrange communications between emergency municipal government headquarters and emergency services.
- (3) To establish communications between municipal emergency government headquarters and zone headquarters.
- (4) To arrange for communications between emergency government headquarters, Army re-entry forces, and municipal emergency services under Army control following attack.
- (5) To arrange for the provision of extra emergency communications equipment where required.
- (6) To recruit and train volunteer communications personnel in peace time.

g. *Transportation*

- (1) To provide transport of all types (road, rail, water and air) for the voluntary evacuation of institutions, hospitals, schools and people who cannot evacuate by private car.

- (2) To provide transport for the evacuation of vital supplies.
- (3) To provide extra transport for other emergency services.
- (4) To co-ordinate transport planning with the federal zone transport controller.

h. Public Information

- (1) To co-ordinate a peace-time public information programme.
- (2) To inform the public of the emergency plans of municipal government and emergency services.
- (3) To inform the public of personal survival action to be taken in peace time and during an emergency
- (4) To co-ordinate the municipal government public information programme during an emergency.

j. Radiological Defence

- (1) To establish a municipal radiological defence organization.
- (2) To recruit and train radiological monitoring personnel in accordance with standards set by the province.
- (3) To recruit a radiological defence officer for municipal emergency headquarters.
- (4) To provide information which can be issued to the public on action to be taken within the municipality if it is subjected to fallout.

k. Rescue Service

- (1) To develop plans for the utilization of trained rescue workers in conjunction with the Armed Forces.
- (2) To recruit and train volunteers as rescue workers in peace time.
- (3) To organize volunteers for integration into Army re-entry forces.

l. Warden Service

- (1) To assist in the dissemination of information to householders in peace time.
- (2) To organize and assist in training of self-help protection groups in firefighting, first aid and rescue.
- (3) To assist people with preparation of personal survival plans.
- (4) To ensure that the warning is received by everyone.
- (5) To assist those who decide to evacuate and ensure that those who remain take shelter.

- (6) To provide leadership after attack and organize survivors in fire fighting, first aid and rescue.
- (7) To assist re-entry forces in the rescue of survivors.
- (8) To recruit and train volunteer wardens in peace time.

RADIATION EXPOSURE LEVELS AND EARLY EFFECTS

1. General

- a. This annex is a summary of the current policy on radiation exposure for the Canadian Forces.
- b. While radiation exposure levels are established for the guidance of unit and formation commanders the aim must always be to keep radiation doses received by all personnel as low as possible.

2. Emergency Conditions

a. *Levels*

- (1) The variation in biological response to radiation does not permit accurate prediction of the effect of any dose. However, the following radiation exposures are considered to be the maximum to which personnel can be exposed without the expectation of some early loss of operations effectiveness. The probability and degree of such loss will increase as the effective dose increases above these levels.

(a) 100r in under six weeks

(b) 200r in over six weeks

- (2) Doses of radiation greater than 100r, if received in one day, are expected to produce the effects given in Appendix 1.

b. *Combat Zones and Survival Operations*

In an emergency some operational situations may require exposure of personnel to doses in excess of those shown above. Areas where personnel will receive 100r in 48 hours will be considered as emergency risk areas and time of occupancy must be controlled. The boundaries of these areas must be re-established as often as practicable and at least every 48 hours. Compared to gamma radiation, beta radiation is considered a minor hazard which will be avoided by the use of protective material. Decontamination of equipment and personnel will be carried out when, where, and to the extent considered practicable.

c. *Support Areas*

In support areas, in both combat and survival operations, it is important to limit exposure to 25r per week. A dose of 200r in a six-week period must not be exceeded. Areas where personnel will receive 25r in a week will be desig-

nated moderate risk areas and the boundaries of such areas must be redefined at least weekly. Beta radiation must be considered a significant hazard in moderate risk areas and personnel and equipment will be decontaminated on leaving the area.

d. *Radiation Exposure Information*

Unit monitors will provide the commander with an estimate of the radiation to which personnel may be exposed at any time during any operation. The medical officer, or other designated officer, will maintain individual dose records,

APPENDIX 1
TO ANNEX D

**EARLY EFFECTS OF RADIATION ON INDIVIDUALS
AND UNITS**

Radiation Dose Within 24 Hours	Probable Early Effect On Individuals	Probable Effects on Unit Efficiency
100-150r	Acute effects of military significance are improbable. Long-term hazard.	Probably no significant loss in unit effectiveness. A few men may be incapacitated for varying lengths of time.
150-250r	Nausea and vomiting within one day. Minor incapacitation after two days.	The effectiveness of a unit would possibly be reduced by one third for periods of about 48 hours.
250-350r	Nausea and vomiting in under four hours, followed by a symptom-free period, lasting from about the third day to the end of the second week after exposure. Some deaths in four to six weeks and most of remainder incapacitated.	A unit will be greatly reduced in effectiveness during the nausea period, but less reduced if the emergency is great. The effectiveness may return almost to normal in two days and remain so for up to a week, but will then fall off to complete ineffectiveness in about two weeks.
350-600r	Nausea and vomiting in under two hours. Death is almost certain in four weeks. Incapacitation until death.	A unit <i>may</i> be partially effective for several hours, but the effectiveness will then be steadily reduced to complete uselessness.
600r	Nausea and vomiting almost immediately. Death in one week.	Any unit will be quickly reduced to complete ineffectiveness.
5000r	Immediate incapacitation. Death within 24 hours.	Any unit will become ineffective immediately.

RESTRICTED

NOTES